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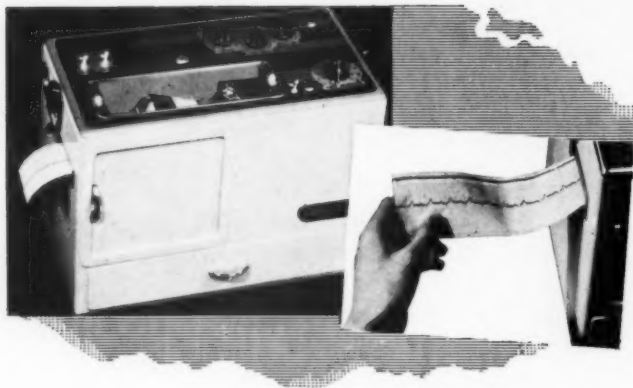
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EDITOR OF THE MONTH

FRED B. MOOR, M.D.

Los Angeles, Calif.

Southern Medical Association Meeting

Section on Physical Medicine and Rehabilitation

November 5, 1951

Dallas, Texas

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Presentations limited to twenty minutes with ten minutes for discussion —
thirty-minute periods.

Monday, November 5, 1951, 1:30 p. m.

1. **Chairman's Address. Physical Medicine in the Management of Peripheral Nerve Injuries.**
E. M. SMITH, Chief, Physical Medicine, Consultants Division, Department of the Army, Office of the Surgeon General, Washington 25, D. C.
2. **Electromyography in the Practice of Physical Medicine and Rehabilitation.**
JAMES G. GOLSETH, Medical Director, Pasadena Clinic of Physical Medicine, 1060 East Green Street, Pasadena 1, California.
Discussion opened by Sedgwick Mead, St. Louis, Mo.
3. **Physical Treatment of Fractures.**
EDWARD M. KRUSEN, JR., Director of Physical Medicine, Baylor University Hospital, Dallas 1, Texas.
Discussion opened by Lee T. Ford, St. Louis, Mo.

INTERMISSION

4. **Present Status of Use of Ultrasonic Energy in Physical Medicine.**
FRANK H. KRUSEN, Section on Physical Medicine and Rehabilitation, Mayo Clinic, Rochester, Minnesota.
5. **The Role of Occupational Therapy in the Physical Medicine Management of Physical Disabilities.**
C. D. SHIELDS, et al., Chief, Physical Medicine Service, Brooke Army Medical Center, Fort Sam Houston, Texas.
Discussion opened by A. Ray Dawson, Richmond, Virginia.
6. **Post-Injection Paralysis.**
G. D. WILSON and W. F. HILLIER, Asheville, North Carolina.
Discussion opened by E. M. Smith, Washington, D. C.
7. **Some Considerations Regarding Long-Term Rehabilitation of Brain Injuries.**
BEN L. BOYNTON, Chief, Physical Medicine Rehabilitation Service, and
LEWIS A. LEAVITT, Assistant Chief, Physical Medicine and Rehabilitation Service, Veterans Administration Hospital, Houston 4, Texas.
Discussion opened by Raoul C. Paaki, Fort Sam Houston, Texas.
8. **Conservative Treatment of Degenerative Arthritis of the Knee.**
OSCAR O. SELKE, JR., Department of Physical Medicine, Hermann Hospital, Houston 5, Texas.

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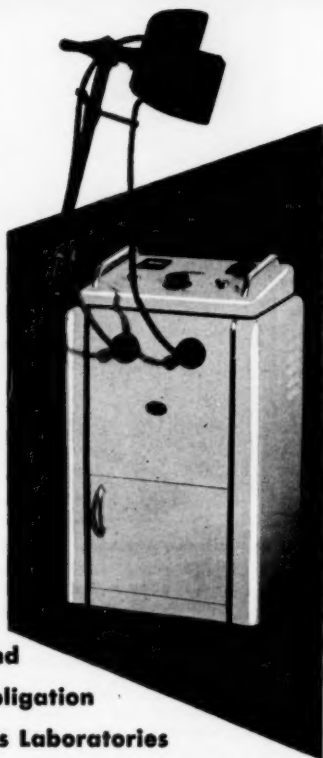


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SEX AND AGE DIFFERENCES IN THE MECHANICAL ABILITY OF PHYSICAL THERAPY MATRICULANTS *

F. A. HELLEBRANDT, M.D.

SARA JANE HOUTZ, M.S.

and

THELMA PEDERSEN, M.A.

RICHMOND

Between 1947 and 1950 the MacQuarrie Test of Mechanical Ability was administered to 192 matriculants of four widely separated physical therapy schools. Analysis of the *total scores* obtained on this extensively used test indicated that the mechanical ability of physical therapy matriculants is higher than that of the population used for the establishment of the adult norm applicable to both men and women, and that although sex and age differences occur, the magnitude of these differences is too small to be significant statistically.¹ The mean MacQuarrie score of the men was slightly higher than that of the women, and that of the younger matriculants exceeded the average of the older. Further analysis of the total scores in relation to norms differentiating between the sexes indicated that although the mechanical ability of the men was seemingly somewhat superior to that of the women, they compared less favorably with men as a whole than the women did in comparison with other females.

The original edition of the MacQuarrie test, which was devised in 1927,² has been taken by more than 5,000,000 individuals. It is composed of seven paper and pencil subtests designated as follows: *tracing, tapping, dotting, copying, location, blocks and pursuit*. These have been subjected to factorial analysis by Harrell,³ Goodman,⁴ and Chapman.⁵ It appears that tracing, tapping and dotting are highly saturated with a common factor best described by the term controlled manual movement. Exceptional achievement in these subtests requires both speed and accuracy and is dependent upon good eye-hand coordination. Copying, location, blocks and pursuit are all affected by acuity of spatial visualization. Ballistic movement enters only into the tapping test. Although the loadings are not high, dotting and location appear to have an additional common factor related to quickness of perception.

Harrell defines mechanical ability as that constellation of capacities necessary for the successful mastery of work that involves manipulation of tools, the operation of machinery, and the planning and execution of tasks composed of such skills. He differentiates mechanical ability from motor ability and gives to the latter a much more limited connotation. Wittenborn⁶ likewise invests the term mechanical ability with qualities other than motor skill. He believes manual dexterity calls for visual recognition and discrimination as well as manipulative ability, and considers the spatial factor of pre-eminent importance in the prediction of mechanical promise. We have already postulated that mechanical ability, thus broadly defined, is probably a factor of considerable moment to success in physical therapy and have found that, in

* From the Baruch Center of Physical Medicine and Rehabilitation, Medical College of Virginia.
1. Hellebrandt, F. A., Houtz, S. J., and Pedersen, T.: Mechanical Ability as a Factor in Aptitude for Physical Therapy, *Med. Ed.* in press.

2. MacQuarrie, T. W.: A Mechanical Ability Test, *J. Personnel Research* 5:329, 1927.

3. Harrell, W.: A Factor Analysis of Mechanical Ability Tests, *Psychometrika* 5:17 (March) 1940.
4. Goodman, C. H.: The MacQuarrie Test for Mechanical Ability, II. Factor Analysis, *J. Applied Psych.* 32:150 (April) 1947.

5. Chapman, R. L.: The MacQuarrie Test for Mechanical Ability, *Psychometrika* 13:175 (Sept.) 1948.
6. Wittenborn, J. R.: Mechanical Ability, Its Nature and Measurement. II. Manual Dexterity, *Ed. & Psychol. Measurement* 5:395 (No. 4, Winter), 1945.

our own students, it bears a significant relation to the General Education Index and to achievement in the technical phases of the training school curriculum. Tests of mechanical ability have been used in the study of the aptitudes of students of nursing,⁷ engineering,⁸ and dentistry.⁹

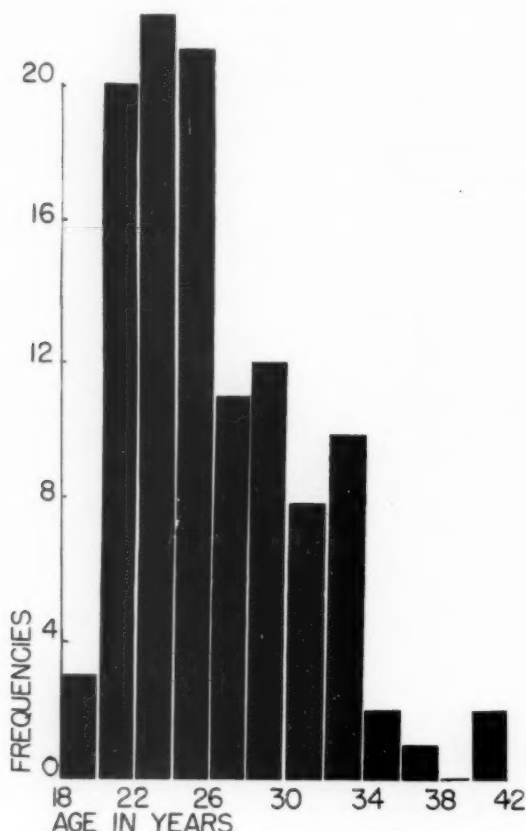


Fig. 1. — Age distribution of 113 physical therapy matriculants representing one class in each of four collegiate type physical therapy schools.

Previous experience with the MacQuarrie test in a variety of industrial situations suggests that the *total score* may obscure the influence of specific qualities which become clearly selective when analysis is made of *subtest performance*.¹⁰ Reviewing this evidence it seemed justifiable to subject the data available on physical therapy matriculants to further subtest analysis, and to

7. Burr, M.: The MacQuarrie Test for Mechanical Ability; An Experiment in a Nursing School, *Am. J. Nursing* 34:378 (April) 1934.

8. Brush, E. N.: Mechanical Ability as a Factor in Engineering Aptitude, *J. Applied Psych.* 25:300 (June) 1941.

9. Harris, A. J.: The Relative Significance of Measures of Mechanical Aptitude, Intelligence, and Previous Scholarship for Predicting Achievement in Dental School, *J. Applied Psych.* 21:513 (October) 1937.

10. Manual of Directions, MacQuarrie Test for Mechanical Ability, California Test Bureau, Los Angeles, California, n. d.

re-evaluate the influence of sex and age on the elements of mechanical ability measured by the MacQuarrie test, since both sex and age are currently important considerations in the establishment of sound training school selection policies.

Subjects of the Investigation

MacQuarrie subtest scores were available on 112 physical therapy matriculants, 53 of whom were men. These represent a single class of each of four collegiate type schools. The age distribution of these students is illustrated in Figure 1. It ranged from 18.92 to 41.25 years. The mean age of the men was 26.96 years and that of the women was 25.24 years. The enrollment in the individual schools was 10, 20, 35 and 47; the proportion of men was 40, 35, 49 and 53 per cent, respectively, and the average age was 27.55, 25.00, 25.00 and 26.68 years, respectively. The observations of the first three schools cited were made on 1948-49 matriculants; those of the last school, on 1950-51 matriculants. This may explain the higher proportion of men admitted to the last school, for the influx of males into the profession has grown progressively greater in each recent year. Although the four schools contributing data vary greatly in size, the relative number of men matriculants and the mean age of the groups was surprisingly similar. This suggests that the sample available for study is probably quite representative of the physical therapy matriculant population as a whole.

Results and Their Interpretation

The frequency distribution of the scores on all subtests indicates that the mechanical ability of physical therapy matriculants varies widely. The group as a whole is most homogeneous in tapping and dotting. The percentile rank for all mean scores fell above 50. This confirms the general superiority of physical therapy students as to mechanical ability in comparison with the norms based on 1000 males and 1000 females aged sixteen and over.

The group of 112 matriculants was subdivided arbitrarily, differentiating all under 30 years of age from those in the 4th decade and older. Approximately one-fifth of the students (20.54 per cent) fell into the latter category. No distinction was made between sexes. The MacQuarrie subtest scores were then converted into percentile ranks, using the combined norms applicable to males and females. To render the data obtained on the two groups comparable, the relative distributions were graphed. Where the frequencies approximated a normal distribution, the curves were skewed consistently toward the positive side. The degree of skewness was somewhat greater for the younger than the older subjects. On a number of tests none of the older subjects attained the 99th percentile. The relative incidence of poor scores was consistently greater in the older group, who appeared to be especially at a disadvantage in subtests demanding acuity of spatial visualization. There was less difference between the older and the younger matriculants on subtests calling for controlled manual movement and dexterity. Figure 2 is a composite of the findings. At all levels of mechanical ability above the 50th percentile the relative number of younger subjects exceeds that of the older. The representation of the two groups is essentially equal at the 50th percentile. Below this rank, the incidence of older matriculants is increasingly greater than that of the younger. Thus, subtest analysis bears out the impression obtained from the statistical study of total MacQuarrie scores and suggests that the handicap of age, though small, may be important

because it affects the factor in mechanical ability which has been given greatest weight in the prediction of mechanical promise.

Sex differences in MacQuarrie subtest scores were first analyzed in comparison with the combined norms applicable to males and females aged sixteen and over. The mean MacQuarrie score of the 59 female physical therapy matriculants was 67.76 ± 12.62 and that of the 53 males was 68.13 ± 12.12 . The coefficient of variation were 18.62 and 17.79, respectively. The difference between the two groups was insignificant statistically ($t .16$). Superior

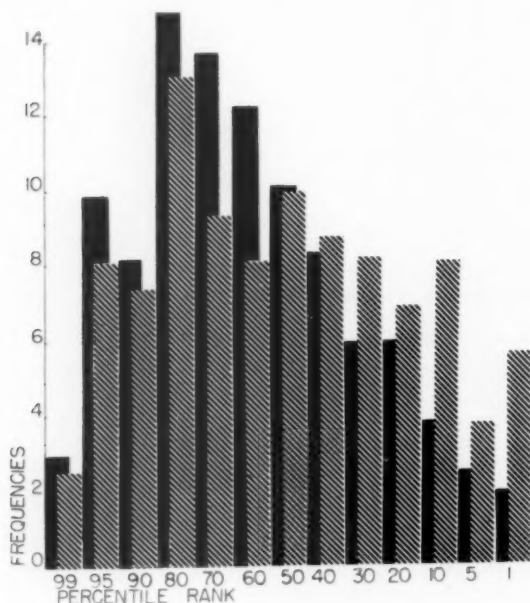


Fig. 2. — Column diagram of the relative frequency distribution of the mean of the sum of the incidence of subjects falling in each percentile rank of the combined subtest norms applicable to both sexes. The solid columns represent 49 physical therapy matriculants under age 20; the crosshatched columns, 23 matriculants 20 years old or older.

scores (90th percentile or above) were obtained by a higher percentage of men than women in two subtests only, but both of these were strong measures of the important spatial factor. The two groups differed most sharply in the number of individuals with scores in the 30th percentile or below. More women than men made inferior scores in five out of seven subtests. However, as pointed out in our first paper, the males enjoy an advantage when their MacQuarrie scores are compared with the norms applicable to both sexes, while the females suffer a handicap not operative when their scores are compared with those of other women. The subtest scores of both groups were therefore studied in their relationship to norms differentiating the sexes. The evidence is summarized in figure 3. Apparently fewer men than women with superior mechanical ability are being attracted to the profession of physical therapy. The superiority of the women is now clearly evident.

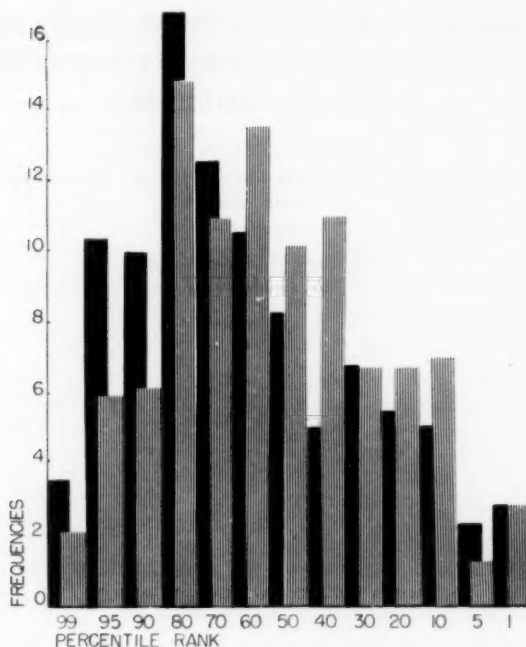


Fig. 3. --Column diagram of the relative frequency distribution of the mean of the sum of the incidence of subjects falling in each percentile rank of separate subtest norms based on 1000 males and 1000 females aged 16 and over. The solid columns represent 59 women physical therapy matriculants; the lined columns, 53 men matriculants.

Summary and Conclusions

The MacQuarrie subtest scores of 112 physical therapy matriculants representing four physical therapy schools were studied in terms of sex and age differences in mechanical ability. The evidence presented supports the following conclusions:

1. The mechanical ability of younger matriculants is better than that of students aged 30 or older.
2. The handicap of age affects spatial visualization more than manual dexterity.
3. The mean mechanical ability of men is slightly superior to that of women when the scores of both are compared with the same norm.
4. Women physical therapy matriculants appear to be considerably superior to men when the MacQuarrie scores of each are compared with norms established for their respective sexes.
5. The evidence suggests that both sex and age should be considered in the selection of applicants for admission to physical therapy schools.

Acknowledgements: The valued assistance of the cooperating schools is gratefully acknowledged.

COMBINED USE OF CORTISONE, ACTH AND REHABILITATION TECHNIQUES IN CERTAIN ARTHRITIS PROBLEMS*

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and

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NEW YORK

It is estimated that nearly 7,000,000 people in the United States have some form of rheumatic disease. Rheumatism and arthritis rank second among diseases producing disability and invalidism.¹ For years the combined efforts of doctors interested in surgery, internal, and physical medicine failed to achieve more than moderate success in combatting the most severe of these illnesses, rheumatoid arthritis. In September, 1948, Dr. Hench made his first clinical tests with ACTH (adreno corticotrophic hormone) and with an adrenal cortical preparation labeled Compound E by Dr. Kendall.² The dramatic results which he reported in the rheumatic diseases have been widely confirmed.³ For the first time we have available a drug which reverses the symptoms of arthritis rapidly and unmistakably.

After the first rush of success, certain facts which had been emphasized in early reports became more apparent. Compound E, or as it is now known, cortisone, cannot rebuild bone nor can it overcome faults in gait or long standing deformities which have resulted from sparing a painful joint or tendon, or voluntarily limiting motion for a long time. This realization, which is obvious to any one interested in physical medicine or in rheumatic disease, has led to isolated expressions of dismay that cortisone is good only in the treatment of early arthritis.

For several years, our clinic working with the Institute for Crippled and Disabled, has been making an attempt to rehabilitate some of the more severely handicapped arthritics. In this work various techniques have been used and reported elsewhere such as physiotherapy, drug therapy with curare and mephenesin (myanesin) and various combinations of techniques.⁴

Some of these methods have shown promise, but in general our physical therapy was bound by the precept that exercise must be kept within limits of pain and fatigue.⁵ Whenever we ignored these rules the patient has paid the penalty subsequently with an increase in pain, deformity or contracture the day after such excess treatment. With the advent of cortisone therapy, the problem of proper ancillary care tended to solve itself as far as early

* From the Department of Medicine, College of Physicians and Surgeons, Columbia University, the Faulkner Arthritic Clinic of Presbyterian Hospital, New York, and the Institute for Crippled and Disabled, New York.

1. Hench, P. S., et al.: Ninth Rheumatism Review, *Ann. Int. Med.* **28**:66, 1937.

2. Hench, P. S.; Kendall, E. C.; Slocumb, C. H., and Polley, H. F.: The Effect of a Hormone of the Adrenal Cortex (17 hydroxy-11 -- dehydrocorticosterone: Compound E) and of Pituitary Adrenocorticotrophic Hormone on Rheumatoid Arthritis: Preliminary Report, *Proc. Staff Meet., Mayo Clinic* **24**:181 (April 13) 1949.

3. Roland, E. W., and Headley, N. E.: Effects of Cortisone Acetate on Rheumatoid Arthritis, *J. A. M. A.* **141**:301 (Oct. 1) 1949.

4. Schlesinger, E. B., and Ragan, C. A.: "Muscle Spasm" in Acute Low Back Pain and Similar Syndromes, *Am. J. Med.* **1**:621, 1946.

5. Conroe, B. I.: *Arthritis and Related Conditions*, p. 181, 3rd ed., Lea and Febiger, 1944.

and mild cases were concerned. The patients with minor contractures and voluntary muscle splinting due to pain lost their pain and contractures so quickly that physical therapy was needed only to assist in restoration of full range of motion and in rebuilding of atrophic muscle. This was done without deviation from known and accepted techniques of physical therapy.

We are presently concerned with the patients who have had fairly longstanding arthritis with loss of muscle strength, easy fatigability, apparently irreversible contractures, and deformities. These would not respond completely to cortisone alone and in the past had failed to respond to physical procedures also. We hesitate to indict either physical or pharmacological treatment, for on one hand it is known that some patients respond more slowly than others to cortisone therapy and on the other hand that some of the physical therapy given has been quite haphazard and incomplete. Some patients in reciting previous treatments received, have in fact stated that supervised exercise or even advice regarding exercise had played no part in their program.

The first patient treated by means of these combined techniques was A. R., insurance broker with Marie-Strumpell arthritis, whose disease progressed in spite of older forms of therapy, physical measures and radio therapy. When first seen he was walking with difficulty using two canes, his posture was poor as he had a pronounced dorsal kyphosis. His wrists, elbows and shoulders were painful and range of motion was limited. He walked by moving at the knee joints rather than the hips. His knees could be abducted only two inches and appeared to be fixed in position. With ACTH his pain was greatly relieved, but there was no increase in range of motion and atrophy of muscles made voluntary exercises difficult to impossible. At this time it was felt that there was nothing to lose by supplementing ACTH with intensive physiotherapy. A program of stretching the knees and forcing them together, then flexing and extending at the hips forcibly was begun. We purposely went beyond what would be considered the normal maximum since the patient was still on ACTH. On each following day, instead of finding the patient in great pain and joints worse than before, he was ready for a new treatment which again was given beyond the usual limits of pain. It is not necessary to go into the actual techniques used but standard resistive exercises, muscle setting and range of motion exercises were performed⁶ and then we forcibly abducted, adducted, flexed and extended the legs at the hips as noted before, always carrying the exercise beyond the point of mild pain.

This plan was continued for two weeks in the hospital with good results but it was apparent that progress would be slow and that the patient needed the stimulus of other trainees to encourage further progress. Even so, three days after ACTH was stopped, he was able to walk with one cane before leaving the hospital. A. R. was then transferred to the Institute for Crippled and Disabled for further training, which consisted of continuation of his exercises, gait instruction, use of special apparatus such as the stationary bicycle and enrollment in occupational therapy such as work on the foot operated jig saw. Since ACTH had been stopped we now limited exercise to what could be accomplished with only slight pain.

When last seen, twenty weeks after treatment with ACTH, this man walked into our clinic without the use of any canes. His kyphosis was not materially improved. His hips could be abducted so that the knees were eight inches apart and he walked with normally progressive gait instead of his former scissors gait. His attitude toward life has changed so that now

6. Mennell, Jas.: *The Science and Art of Joint Manipulation*, Vol. 1, 223 pp., P. Blakiston Son & Co., Phila., 1939.

he is eager to work. Our problem now is whether to enroll him in one of the Institute courses which will provide training in a more sedentary job or to let him consider a return to his old job.

The major point which we wish to make in regard to this man, and to those who are more briefly summarized, is that physical or medical procedures alone could not help because the disease activity would not allow intensive exercise. ACTH or cortisone alone were not completely effective because severe contractures and deformities change very little without the addition of intensive physical measures.

The following is a summary in brief of a small group consisting of this and other patients who have been treated. Not all have done well, since the effectiveness of physical measures is just as dependent on the patient's co-operation as on the ability of the physician.

Conclusions

(1) ACTH or cortisone alone are not completely effective in reversing the symptoms of severe long-standing arthritis.

(2) Physical measures which are strenuous enough to help severe arthritides are impossible without cortisone or ACTH, because the rebound effect leaves the patient worse than before.

(3) Using ACTH or cortisone and physical measures together, it is possible to increase range of motion and muscle power, to relieve pain and, in short, to rehabilitate severely handicapped people who would not be helped by either measure alone.

(4) The use of drugs and in-patient physical therapy is just a beginning in treatment and must be supplemented with supervised rehabilitation techniques to maintain the progress initially made.

Discussion

Dr. W. B. Snow (New York, N. Y.): Dr. Coss has very satisfactorily explained what happened to these patients. The physical therapy used, as he says, has gone beyond the limit of pain and in certain of these cases forceful manipulation had to be done.

We have to be careful when manipulating old arthritides because of the danger of the results of manipulation. Osteoporotic bone tissue may be involved, so that the manipulation must be preceded by careful, studied x-rays and always done with

a short lever, and careful application of forces.

I am glad to hear Dr. Coss say something about the bicycle. We still think the bicycle is a pretty valuable instrument, whether the principle is used in occupational therapy or physical therapy. These patients received a great deal more heavy resistance exercise than they would have received had it not been for cortisone. Cortisone, by allaying the acute inflammatory process which so often follows over activity in arthritis, makes this combined treatment possible.



EFFECT OF NEOSTIGMINE STUDIES ON SPASTICITY OF SKELETAL MUSCLE IN UPPER MOTOR NEURON LESIONS **

Preliminary Report

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and

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Parenteral neostigmine when given in sufficient quantities, produces twitching of skeletal muscle.¹ This is due to spontaneous contractions of single motor units commonly called fasciculations,² and is presumably produced by the influence of accumulating acetylcholine.³ The acetylcholine accumulates because of the anticholinesterase action of neostigmine. Also, neostigmine itself has a pharmacologic action similar to that of acetylcholine.⁴

It is known that denervated muscle fibers become sensitized to acetylcholine at the myoneural junction.⁵ It has also been shown in the cat that muscles with intact lower motor neurons but deprived of upper motor neuron control, are relatively more sensitive to acetylcholine than normal muscle.⁶ The present study is being done to determine whether in humans with upper motor neuron lesions, sensitization of the affected muscles to acetylcholine also occurs.

Studies were made of three cases of transverse myelitis and five cases of cerebro-vascular accidents. These paraplegics and hemiplegics varied in the degree of spasticity from case to case. In addition to observation of the effect of neostigmine upon the intensity of fasciculation in the paralyzed or parietic muscles as compared to the normal parts of the body, the influence of this drug on spasticity and muscle power was also noted. In order properly to evaluate results, it is important to note that normally, fasciculation occurs maximally in those muscles innervated by the lower cranial nerves and the cervical and brachial plexus and to a lesser extent in the rest of the body.⁷

Neostigmine was given by the intramuscular, intravenous and intra-arterial routes in doses from $\frac{1}{4}$ to 3 mg. The dosage was gradually increased in an attempt to determine the threshold at which fasciculation occurred and

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Read before the Annual Convention of the American Congress of Physical Medicine, Statler Hotel, Boston, Mass., September 1, 1950.

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also in order to avoid untoward reactions. Atropine, grains 1/150 to 1/50, was given simultaneously to prevent muscarinic effects.

Studies in Transverse Myelitis

Two of the three patients with transverse lesions investigated, showed marked spasticity. Their lesions were at T6 level. The third one had spasticity to a minor degree. His lesion was at T12 level. Intra-muscular injections of $\frac{1}{2}$, 1, and 2 mg. of neostigmine were given on three successive days. Fasciculations appeared earlier in the muscles of the shoulder girdle than in the lower extremities and were more intense. Those appearing in the lower extremities were very few, lasted for only a short time and appeared only with doses of 2 mg. Fasciculations appeared in the shoulder girdle 30 minutes after the injection, while it took 45 minutes for those of the lower extremities to become apparent.

There was apparently no relationship between the intensity of the fasciculations and the degree of spasticity, and the relationship between the intensity of fasciculations and the dose of neostigmine was inconstant. Although no sensitization of the muscles in paraplegic limbs could be shown, the observations cannot be considered as conclusive, since the upper part of the body, being normally more sensitive to acetylcholine, does not offer a suitable control (fig. 1).

PARAPLEGICS												
	PATIENT	8/16 PROST. $\frac{1}{2}$ MG.			8/17 PROST. 1 MG.			8/18 PROST. $1\frac{1}{2}$ MGS			8/21 PROST. 2 MGS	
		BP	$\frac{1}{2}$ HR	AP	BP	$\frac{1}{2}$ HR	AP	BP	$\frac{1}{2}$ HR	AP	BP	$\frac{1}{2}$ HR
SPASTICITY	B.	+	+	+	+	+	+	+	+	+	+	+
	V.	+++	+++	+++	+++	+++	+++	+++	+++	++	+++	+++
	M.	++++	++++	++++	++++	++++	++++	++++	++++	++++	+	++++
MUSCLE POWER UPPE	B.	N	N	N	N	N	N	N	N	N	N	N
	V.	N	N	N	N	N	N	N	N	N	N	N
	M.	N	N	N	N	N	N	N	N	N	N	N
FASCICULATION	B.	O	O	O	O	O	O	O	O	O	SG +	SG +
	V.	O	O	O	O	O	O	O	O	O	LE +	LE +
	M.	O	O	O	O	O	O	O	O	O	SG +	SG +

KEY { BP-BEFORE PROSTIGMINE
AP-AFTER PROSTIGMINE
SG-SHOULDER GIRDLE
LE-LOWER EXTREMITY
N-NORMAL

Fig. 1. — Chart showing the effect of prostigmine on spasticity, muscle power and in the production of fasciculation in the paraplegic.

Studies in Cases of Cerebro-Vascular Accidents with Residual Hemiplegia

Five patients of this type were studied, three receiving intramuscular injections of neostigmine, one receiving intra-arterial injections and one receiving intravenous injections.

a) **Intramuscular Injections of Neostigmine.** — Of the three patients, one had a left and two a right hemiplegia. The left and one right hemiplegic were markedly spastic, whereas the third case was only mildly spastic. All three were given daily intramuscular injections for three weeks in doses which were gradually increased from 1 to $2\frac{1}{2}$ mgs. They were observed every other day for one hour following the injection.

Fasciculations first appeared from about thirty to forty-five minutes after injection and gradually grew more intense. They were more intense and prolonged in the upper part of the body and in the proximal parts of the limbs. They were much more marked on the hemiplegic side in all three cases. The difference between the two sides was more apparent in those areas where fasciculation is more visible, namely, in the muscles of the shoulder girdle. Here too, the intensity of fasciculations bore no relationship to the degree of spasticity. The relationship between the intensity of fasciculation and the dose of neostigmine was inconstant; however, it was apparent in a general way that the fasciculation was increased with increasing dosage of the drug (fig. 2).

		HEMIPLEGICS																													
	PATIENT	9/28 PROST. 1/4 MG.						10/4 PROST. 1 MG.						10/7 PROST. 1 1/2 MG.						10/11 PROST. 2 MG.						10/21 PROST. 2 1/2 MG.					
		BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP	BP	1 HR AP	2 HR AP			
SPASTICITY	T	U	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++			
	L	U	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++			
	M	U	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+			
	L	U	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++	++			
MUSCLE POWER (DYNAMOMETER)	T	U	40	37	40	30	30	30	40	40	40	40	35	35	35	40	40	40	35	35	35	40	40	40	40	40	40	40			
	M	U	10	35	30	40	45	40	45	45	45	40	40	40	40	40	40	35	35	35	40	40	40	40	40	40	40				
	A	U	40	35	40	35	35	40	40	40	40	30	40	50	40	55	40	50	40	55	40	40	40	40	40	40	40				
	L	U	40	35	40	35	35	40	40	40	40	30	40	50	40	55	40	50	40	55	40	40	40	40	40	40	40				
FASCICULATION	T	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	M	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	A	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
	L	N	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

KEY

BP-BEFORE PROSTIGMINE
SP-AFTER PROSTIGMINE
N-NORMAL SHOULDER GIRDL
H-HEMIPLEGIA SHOULDER GIRDL
W-WHIPPER EXTREMITY
L-LOWER EXTREMITY
BT-TBACE

Fig. 2. — Chart showing the effect of prostigmine on spasticity, muscle power and in the production of fasciculation in the paraplegic.

Unlike the paraplegics, who complained considerably about visceral reactions such as cramps, nausea and a desire to void, the hemiplegics were practically unaffected by high doses.

There were no apparent changes in the spasticity with any dose of neostigmine and the muscle power as measured with a hand dynamometer was unchanged. In this group, the normal side could be considered as an adequate control.

Although these three cases showed a greater sensitivity to neostigmine on the hemiplegic side, further information was necessary in order to determine whether the effect was on the muscle itself and its muscle end-plate or on the anterior horn cell. Intravenous and intra-arterial injections were given in order to determine the site of action of the neostigmine effect.

b) Intra-arterial Injections of Neostigmine. — A left hemiplegic had $\frac{1}{4}$ mg. of neostigmine injected into each femoral artery, the right 15 seconds before the left. No fasciculations appeared in the cranial or shoulder area since no systemic effects should be expected with such small quantities of neostigmine. Within a very few minutes, fasciculations appeared in both lower extremities, first in the thigh muscles then in the calf muscles. They were much more marked on the left side, a fact which was confirmed by electromyographic tracings taken from both sides (fig. 3).

It can be assumed in this case that the fasciculation producing effect of neostigmine occurred locally in the muscles supplied by the femoral artery. The evidence for this statement is twofold. Firstly, fasciculation does not occur in the rest of the body even when $\frac{1}{4}$ mg. of neostigmine is given in-

travenously; secondly, whenever there is a systemic effect the shoulder girdle responds more quickly and more intensely. From the evidence in this case, it can be assumed that an action on the spinal cord was not responsible for the increased fasciculation on the hemiplegic side.

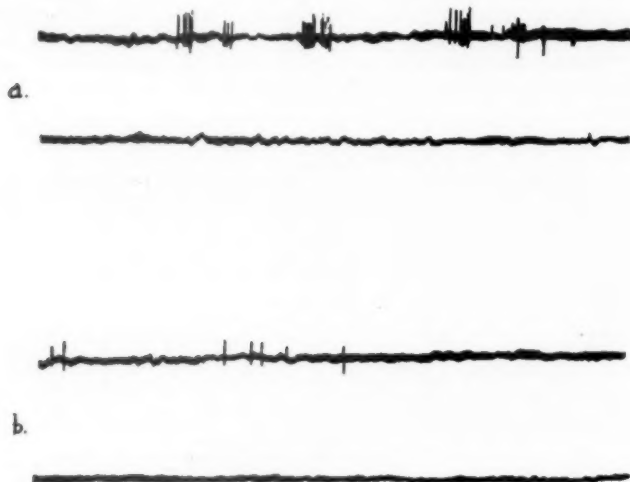


Fig. 3. — The effect of prostigmine on skeletal muscle in a left hemiplegic: a. (Top Line) — Electromyographic tracing from the left quadriceps showing large number of fasciculations. a. (Bottom Line) — Tracing from the right quadriceps showing no fasciculations. b. (Top Line) — Tracing from the left anterior tibial muscle showing a few fasciculations. b. (Bottom Line) — Tracing from right anterior tibial muscle showing no fasciculation.

c) **Intravenous Injection of Neostigmine.** — A patient with a right hemiplegia was used. In order to avoid intravenous injections of large doses of neostigmine, the patient was first given 1 mg. intramuscularly, which did not produce fasciculation in 30 minutes. At the end of that time, another $\frac{1}{4}$ mg. was given intravenously. Within 30 seconds, fasciculation appeared with the usual distribution and was more intense on the right. The next day these dosages given the same way were repeated on the same patient, except that now the right arm was occluded by a tourniquet at its uppermost portion for 10 minutes after the intravenous injection into the left antecubital vein. During the time that the tourniquet was on, only rare twitches of the right biceps and triceps were seen. The tourniquet was then removed. Fasciculation increased in the right arm markedly and almost immediately became more marked than on the normal side. This is further evidence that the neostigmine effect in producing fasciculation has its major role in the periphery rather than in the spinal cord. Whether this effect occurs in the peripheral portion of the nerve, the myoneural junction, or in the muscle, cannot be determined at this time. It is assumed that for the normal, the effect is only on the myoneural junction.

Conclusions

- (1) Neostigmine in doses of $\frac{1}{4}$ to 3 mg. had no effect on spasticity and muscle strength in 3 paraplegics and 5 hemiplegics.
- (2) Because of the fact that the upper part of the body is not a suitable

control for the lower, the sensitivity to neostigmine as expressed by fasciculation could not be determined in the paraplegic.

(3) The hemiplegic fasciculates more on the hemiplegic side as a result of neostigmine administration. This may be due to a greater sensitivity of the neuromuscular structures on the hemiplegic side.

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DIAGNOSTIC FEATURES OF ELECTROMYOGRAPHY *

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Introduction

The diagnostic features of electromyography are limited chiefly to the neuromuscular system pertaining to motion and locomotion by striated muscle. Electromyographic findings should be regarded as laboratory evidence which may be used by the physician to supplement other clinical data for the purpose of establishing a diagnosis.

The minimal requirements for the effective use of clinical electromyography are as follows:

(1) Thorough understanding of basic neurophysiology; (2) Adequate knowledge of the construction and operation of electromyograph; (3) Proper selection of equipment and technique to secure reliable electromyographic data for any given examination; (4) Adequate knowledge of electromyographic criteria regarding the characteristics of normal and abnormal waves in terms of form, amplitude, duration, frequency; power readings, and audio-characteristics. A synopsis of these criteria has been published in a previous article;¹ (5) Familiarity with the electromyographic features of various neuromuscular disorders; (6) Adequate knowledge of clinical neurology and functional anatomy; (7) Thorough understanding of the electromyographic features (including kind, range, and variability) of the normal neuromuscular system and those of lower motor neuron disease; these are used as constant reference criteria in the differential diagnosis of all neuromuscular diseases and disorders.²

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Diagnostic Principles Used in Electromyography

The customary procedure followed in an electromyographic examination of a patient may be summarized as follows:

- (1) Select the muscles to be examined as indicated by the neuromuscular disease, the injured peripheral nerve, or the involved root or cord segment;
- (2) Position the patient comfortably and properly so that the muscles to be examined may be placed in a position of complete rest (elimination of reflex contractions of muscle fibers);
- (3) Select and apply suitable electrodes in a chosen sequence of examination for the selected muscles;
- (4) Examine each muscle at two or more areas and in several directions at different levels of the muscle fibers, so that multiple sampling of different motor units of each area may be accomplished;
- (5) Ascertain the following information at each site of each electrode sampling: (a) presence or absence of electrical potentials during rest (as complete muscular relaxation as can be secured by the patient; (b) presence or absence of electrical potentials during voluntary effort; (c) status of normality or abnormality of the electrical potentials when present; (d) electromyographic characteristics (form, voltage, duration, frequency, regularity and constancy) of the various waves; (e) audio-characteristics (pitch, intensity, duration, repetition frequency and regularity) of the sounds emitted by the loud speaker; (f) maximal power readings (microvolts) in selected areas;
- (6) Recognize, classify and interpret the abnormal electrical potentials;
- (7) Identify and interpret the various audio-phenomena associated with the electrical potentials picked up from the muscles.

The usual indications for electromyography are those requiring assistance in determining the type and the cause of muscular paralysis and in making a differential diagnosis of some neuromuscular disease or disorder. Electromyography may be of assistance to the orthopedic surgeon in cases of fracture and severe trauma of soft tissue where there is a question of a peripheral nerve injury. Likewise, it may provide valuable information for the neurosurgeon when considering nerve suture, resection or neurolysis of peripheral nerves, or assist him in establishing the diagnosis of a ruptured intervertebral disc, in locating the segmental level of the lesion or in recognizing backaches from other causes. Electromyographic findings are now accepted by civilian courts and by retiring boards of the U. S. Army as authentic laboratory evidence comparable to roentgenograms and electrocardiograms. Electromyograms, therefore, become extremely valuable evidence in medico-legal controversies.³

The term paralysis is used to signify the loss of voluntary contraction of skeletal muscle. Paralysis may be caused by any one of several conditions such as: (1) abnormalities of the muscle fibers themselves, (2) disturbed function of the neuromuscular junction, (3) lower motor neuron lesions, (4) transection of the spinal cord, (5) abnormal synaptic block, (6) upper motor neuron lesions, (7) abnormal cortical function. Of these various possible causes of paralysis, that produced by lower motor neuron lesions provides the most positive clear cut diagnostic features. Because of this and also because lower motor neuron disease is a condition most commonly dealt with in electromyography, a thorough understanding of the characteristic features of these diseases is extremely important. The characteristic features of the normal neuromuscular system together with those of lower motor neuron

3. Golseth, J. G.: The Medical-Legal Aspects of Electromyography, to be published.

disease are used constantly as standard or key reference criteria in differential diagnosis of neuromuscular disorders.

The most significant electromyographic data may be secured when the muscles are examined during rest and during voluntary effort. Occasionally it may be desirable to determine the electrical response resulting from passive motion. Some of the electrical behavior which may be observed during rest, voluntary effort and passive motion are mentioned and this significance pointed out:

During Rest

Electrical Silence. — Normal neuromuscular system or the muscles may be fibrosed or degenerated.

Electrical Activity. — Simple motor units — incomplete relaxation.

Fibrillation Voltages. — Denervation of muscle fibers.

Simple Fasciculation Voltages. — Generated by involuntary contraction of a normal or nearly normal motor unit.

Complex Fasciculation Voltages. — Generated by the involuntary contraction of an abnormal motor unit.

During Voluntary Effort

Simple Motor Unit Voltages in All Areas. — Normal neuromuscular system. These appear when the electrode is in the immediate vicinity of an active motor unit. However, when the active motor unit is situated some distance from the needle electrode, the characteristics of the waves are altered in size, shapes, and duration.

Complex Motor Unit Voltages. — Distinct when near the active motor unit and indistinct when far away. They represent either neural degeneration or regeneration, and are regarded, therefore, as abnormal waves.

Fibrillation Voltages. — Signify motor nerve degeneration (denervation) and may be seen in some or all areas depending upon the degree of denervation. They are regarded as the most significant abnormal waves.

Fasciculation Voltages. — Similar to those observed during rest. When they are complex in wave form they are regarded as abnormal and are usually associated with progressive degenerative diseases of the central nervous system.

Almost any combination of these waves may be seen in certain lower motor neuron diseases of the nervous system. However, one generalization may be made, namely, simple motor unit voltages represent normal motor units and complex motor unit voltages, fibrillation voltages and complex fasciculation voltages represent abnormal motor unit responses.

Neurologic conditions which show an increase in electrical activity during passive motion are those which have upper motor neuron lesions (spasticity, rigidity), and hyperactive stretch reflexes (spastic paralysis, "spasm" or "polio"). The responses are usually simple motor unit voltages but in amyotrophic lateral sclerosis, simple and/or complex motor unit voltages may be observed. Diseases which show electrical potentials resulting from hyperactive myotatic reflexes are conditions such as cerebral palsy, amyotrophic lateral sclerosis, multiple sclerosis, hemiplegia, muscular rigidity, and the "spasm" of "polio" muscles. Much of the above mentioned electrical behavior may be encountered in several different diseases or disorders of the neuromuscular system. The presence of one or more abnormal wave forms does not therefore represent specific diagnostic features of a given pathological condition. Additional clinical data are required to establish a specific diagnosis.

TABLE I.

Neuromuscular Condition Disease or Disorder	During Rest	During Voluntary Effort	During Pas- sive Motion
Normal voluntary muscle	Electrical silence	Simple motor unit voltages in all areas	No effect
Abnormality of the muscle fibers themselves Structural changes (fibrosis, fatty degeneration, etc.) Primary muscular disorders (progressive muscular dys- trophy)	Electrical silence	Electrical silence	No effect
Functional abnormality of the neuromuscular junction Myasthenia gravis	Electrical silence	Simple motor unit voltages Amplitude may be lower than normal and the power read- ings may be low. Frequency of the waves may be greater than normal a) Simple motor unit voltages may be of low amplitude b) Rapid reduction of volt- ages during sustained con- traction c) Electrical silence may be reached after 60 seconds of sustained maximal contraction d) Reduction in the size and frequency of the motor unit voltages during sustained con- traction	No effect
Lower motor neuron disease Anterior poliomyelitis 18 days or more after onset showing complete paralysis Anterior poliomyelitis show- ing partial paralysis (mus- cle paresis)	Denervation fibrilla- tion voltages in most areas (segmen- tal distribution) a) Denervation fibril- lation in some areas b) Electrical silence in some areas (seg- mental distribution)	Denervation fibrillation volt- ages in most areas (segmen- tal distribution) Simple and/or complex motor unit voltages in some areas Baseline disturbances in some areas (peripheral distribution)	No effect No effect
Peripheral nerve injury with complete denervation of muscle fibers	Denervation fibrilla- tion in all areas 21 days or more after injury (peripheral distribution)	Denervation fibrillation in all areas	No effect
Peripheral nerve injury with only partial denervation	a) Denervation fibril- lation in some areas, may be discontinuous b) Electrical silence in some areas (periph- eral distribution)	Simple and/or complex motor unit voltages in some areas Baseline disturbances in some areas (peripheral distribution)	No effect
Progressive spinal muscular atrophy	a) Denervation fibril- lation voltages in some areas (segmen- tal distribution) b) Complex fascicu- lation voltages in some areas c) Electrical silence in some areas	a) Simple and/or complex motor unit voltages in some areas b) Base line disturbances in some areas	No effect
Amyotrophic lateral sclerosis involving anterior horn cells and lateral columns of the cord	a) Denervation fibril- lation in some areas (segmental distribu- tion) b) Complex fascicu- lation voltages in some areas c) Electrical silence in some areas	Mixture of waves in varying proportions a) Simple and/or complex motor unit voltages in some areas b) Base line disturbances in some areas c) Fibrillation voltages d) Complex fasciculation voltages	Simple and/ or complex motor unit voltages in some areas

Neuromuscular Condition Disease or Disorder	During Rest	During Voluntary Effort	During Pas- sive Motion
Anterior nerve root and seg- mental spinal cord lesions (tumors, compression from fractures, dislocations, hem- orrhages, ruptured interver- tebral discs)	a) Denervation fibril- lation voltages in some areas of muscles supplied by the nerve root or cord segment involved in the lesion (segmental distribu- tion) b) Electrical silence in some areas c) Simple fascicula- tion voltages in some areas	a) Simple and/ or complex motor unit voltages in some areas b) Base line disturbances in some areas c) Mixture of other waves in varying proportions—such as fibrillation and fasciculation voltages (the latter are usually absent)	No effect
Functional changes in the spinal cord resulting from transection Paraplegia Quadriplegia	a) Electrical silence below level of the lesion b) Segmental dener- vation fibrillation voltages in denervated muscles	Electrical silence unless reflex contraction of muscles occur causing simple motor unit voltages to develop	No effect unless re- flex con- traction of muscles oc- cur causing simple mo- tor unit voltages
Abnormal synaptic block Trauma associated with fractures and injuries, of muscle and joints, inflam- matory changes in muscles —non-denervated muscles of "polio" ("alienated" muscles)	Electrical silence (The presence of fibril- lation voltages sig- nifies denervation)	Electrical silence (paretic muscles show simple motor unit voltages in some areas)	No effect
Upper motor neuron lesions Spasticity (cerebral palsy, hemiplegia, multiple sclerosis)	Electrical silence	a) Simple motor unit voltages in some areas b) Base line disturbances in some areas	a) Simple motor unit voltages in some areas b) No ef- fect in others
Rigidity (Parkinson's disease)	Simple motor unit voltages	Simple motor unit voltages in most areas increased	Simple mo- tor unit voltages in most areas increased
Abnormal cortical functions Malignancy	Electrical silence	Electrical silence or a few simple motor unit voltages— may be intensified by the use of interrupted galvanic current	No effect

The electromyographic characteristics typically found in certain pathological conditions of the neuromuscular system of man are summarized in table I.

By using a combination of the information presented in table I and clinical data obtained from a careful history and physical examination, suitable laboratory tests and a neurological examination, one is able usually to make an accurate differential diagnosis between an upper and lower motor neuron lesion; a primary muscular atrophy and a primary muscular dystrophy, and abnormal synaptic block and a lower motor neuron lesion, a functional paralysis and an organic paralysis; backache caused by acute and chronic postural strain and that caused by root or cord compression lesions. Electromyography provides qualitative and quantitative data of considerable value in establishing diagnoses of pathological neuromuscular conditions. Such in-

formation may assume great importance in the adjudication of claims of military personnel as well as those arising in civilian medico-legal suits.

Summary

1. The minimum requirements of clinical electromyography are outlined.
2. The customary procedure followed in making an electromyographic examination of a patient is reviewed.
3. The usual indications for the use of electromyography clinically are mentioned.
4. The usual causes of neuromuscular paralysis are mentioned and briefly discussed.
5. The customary electromyographic findings encountered in the routine examination of patients during rest, voluntary effort and passive motion are described and the usual significance of each is pointed out.
6. The electromyographic characteristics typically found in pathologic conditions of the neuromuscular system are summarized in tabular form.
7. Mention is made of the neuromuscular disorders in which electromyography is useful in establishing a differential diagnosis — such as — a primary muscular atrophy and a primary muscular dystrophy; an abnormal synaptic block and a lower motor neuron lesion; a functional paralysis and an organic paralysis; an upper motor neuron lesion and a lower motor neuron lesion; a backache caused by acute, or chronic postural strain and that caused by root or cord compression lesions.
8. The medico-legal importance of electromyography is pointed out.



VALUE OF THE PYLON IN PRE-PROSTHETIC MANAGEMENT OF THE LOWER EXTREMITY AMPUTEE *

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The word "pylon" stems from the Greek word meaning gateway. We believe that the choice of this word in medicine to signify a temporary prosthesis for the lower extremity amputee is a very happy one, not only in the sense of support, but also as the gateway for the amputee into a new world where he is to live normally, despite the absence of one or both legs.

Pylons were in accepted use at least as early as 1914.¹ The few papers that have been written on this subject, mostly within the realm of military medicine in connection with the two World Wars, have clearly defined the merits of the pylon.^{2 a-b-d-e-f} Not all authors are convinced as to the usefulness of a temporary prosthesis, one³ stating that "in peacetime makeshift prostheses should not be used as they are not much better than crutches."

The chief criticism^{4 a-b-c-d} concerning the use of the pylon in the pre-prosthetic training of the lower extremity amputee is the belief that its use will result in an unnatural gait characterized by circumduction of the stump, an absence of motion at the knee and an abnormal movement pattern in general. Other objections have been unsightliness, an undesirable shaping of the stump by the use of the pylon,⁵ and the heavy weight of the temporary prosthesis.¹

Pylons have been used at this hospital since the latter part of 1947. We believe the pylon to have unique merits which are not fully realized by physiatrists and orthopedists. The purpose of this paper is to demonstrate that the gait of the lower extremity amputee immediately after receiving the permanent prosthesis is normal and to report that the bulbous stump, breakdown of the stump, irritation of nerve endings and other undesirable results reported from use of the pylon do not occur in actual practice.

* Published with permission of the Chief Medical Director, Department of Medicine and Surgery, Veterans Administration, who assumes no responsibility for the opinions expressed or the conclusions drawn by the authors.

** From the Physical Medicine Rehabilitation Service, Veterans Administration Center and the University of Kansas School of Medicine.

Acknowledgement is made of the assistance and cooperation of Mr. Andrew Cates, Chief Orthopedic Mechanic.

A film has been prepared dealing with the various phases of the construction of the pylon and its clinical use. This film is in color without sound, 15 minutes and is available on request.

1. Peters, B.: Amputee Rehabilitation; Manufacture of Prostheses by Naval Personnel. U. S. Naval Medical Bulletin 45:105, 1945.

2. (a) Chapple, W. A.: A Report on Temporary Pegs for Amputation of the Lower Limb. Brit. Med. J. 2:597, 1918. (b) Broad, W. H.: A Pylon or Temporary Artificial Leg. Brit. Med. J. 1:453, 1918. (c) Toffelmier, D. D., and Laurence, M.: Symposium on Amputation from Naval Amputation Center, U. S. Naval Hospital, Mare Island, California; Manufacture and Fitting of Artificial Limbs. U. S. Nav. Med. Bull. 44: 1149, 1945. (d) Dobrova, O. S.: Temporary Prosthesis for Lower Extremities. Sovet. Med. 4:39, 1940. (e) Thompson, T. C.: Temporary Prostheses. J. A. M. A. 124:1041, 1944. (f) Kirk, N. T.: Amputations in Lewis Practice of Surgery, Hagerstown, W. F. Prior Co., 1942.

3. Ficarra, B. L.: Amputations and Prostheses Through Centuries. M. Rec. 56:94, 1943.

4. (a) Callow, F. H. M.; Keon-Cohen, B. T., and Jens, J. M. J.: Amputations, M. J. Australia 2: 588, 1946. (b) Thomas, A., and Haddan, H. C.: Amputation Prosthesis, Philadelphia, J. B. Lippincott Co., 1945. (c) Harris, R. L.: Amputations, J. Bone and Joint Surg. 26:626, 1944. (d) Rudolph, H. L.: Physical Therapy in After Treatment of Amputations, M. Clin. North America 27:1109, 1946.

5. Mitchell, W. R. D.: The After Care of Amputations, Practitioner 140:55, 1942.

Pylon buckets have been made from plaster of paris, papier-maché, fiber, plywood, gauze gelatinized casings and cardboard cornucopia.^{2 a-b, 6} We have used a synthetic plastic material, celastic, which so far as we are aware has not been employed previously for this purpose. Celastic has proved satisfactory with respect to durability, ease of fabrication and economy.

Preparation of the Pylon Bucket

1. A plaster of paris cast of the stump is made. When the cast is dry, plaster of paris paste is poured into it to form the mold. When the paste is dry, the cast is stripped off and the mold is now ready for use in the construction of the bucket.

2. Horsehide is stretched over the mold with the smooth side down, leaving a two inch overlap at the top. At the junction of the sides of the horsehide, small brads are used to fasten it to the mold.

3. The celastic is cut into strips approximately three inches wide and as long as the mold. These strips are dipped into the solvent before application to soften them. Several of these pieces form a laminated bucket. The number of laminae depends on the weight of the individual; the heavier the individual, the greater the number of laminae. At the ischial bearing point of the bucket, two extra layers of celastic are used to make a satisfactory "seat." The completed bucket is allowed to dry at least six hours on the mold. When it is removed the horsehide and celastic are firmly molded together. The overlap is drawn over the top and glued and tacked to the outside. Since the brads used are no longer needed, they are removed. The bucket is now smooth inside and has a rolled edge at the top.

4. Two pieces of strap iron eighteen inches long, one inch wide and one-eighth inch thick are drilled with holes. Two holes six inches apart are drilled for attaching the bucket and two holes four inches apart are drilled for the wooden bar. The braces are riveted to the celastic bucket with the rivet heads countersunk into the horsehide and celastic. The braces and bucket are now ready for assembly to the peg.

The construction of the entire pylon takes about seven hours. The cost of material for the below knee pylon, using a salvage brace, is \$3.00. The cost of material for the above knee pylon, using a salvage brace, is \$6.20, and an additional \$1.00 and three hours of labor when the brace and knee joint must be fabricated. The average weight of the above knee pylon is four pounds. The below knee pylon weight is three pounds.

Clinical Data

Since 1947, the pylon has been used in 31 amputees. Eight of these patients were old amputees who were admitted for revision of their stump. Three of these eight patients had no revision of the stump but were supplied with the pylon as preliminary to the fitting of the final prosthesis. Seventeen patients had their amputation in this hospital. Six patients were admitted one to eight weeks after amputation performed elsewhere. No patients had previously worn an artificial leg. Twenty-eight patients presented a unilateral amputation. One was a triple amputee, one was a combined upper and lower extremity double amputee, and one was bilateral above knee amputee.

The pre-prosthesis training program may be outlined as follows: Soon

6. Vavpshevich, M. I.: Temporary Prosthesis, *Sovet. Med.* 5:31, 1941.

after the amputation, while patients are still confined to bed, they receive rehabilitation exercises to the unaffected extremities to maintain strength of the musculature and joint mobility, and therapeutic exercises to the stump and hip girdle in the form of active thigh extension and adduction. Later, balance exercises and training in crutch walking are given. Whirlpool treatments are administered when required for wound healing and for improving the texture of the skin. Measures such as alcohol massage and pounding, which have been reported⁷ of value in toughening the stump, have been completely omitted. When the incision is healed the pylon is fitted and whirlpool therapy is discontinued in order not to interfere with the toughening effect of the pylon.⁸ The stumps are bandaged in the usual way⁸ until the patients are supplied with their temporary prostheses. There was no deviation in the routine management of these cases except in the bilateral above knee amputee, for whom the pylons were gradually increased in height to facilitate standing balance.

The essential data pertaining to these patients are summarized in Table 1. Figure illustrates the adaptability of the pylon to a triple amputee.



Illustrating the use of pylons in a triple amputee.

Discussion

While on leave from the hospital, the majority of the patients followed their normal pursuits, including earning activities. One patient, a painter, continued his occupation during this period, climbing ladders and working on scaffolding without difficulty. Other patients engaged in similarly useful, if somewhat less spectacular, occupations. The economy incident to this one advantage alone is significant since the use of crutches would have precluded this.

Not one of our patients displayed any of the abnormalities in gait which are feared and warned against by those who have written on this subject. This was true even following prolonged use of the pylon. The gait pattern

7. Brunnstrom, S.: *Physical Therapy in After-care of Amputations of the Lower Extremity*, U. S. Nav. Med. Bull. 43:634, 1944.

8. Slocum, D. B.: *An Atlas of Amputations*, St. Louis, C. V. Mosby Co., pp. 466-464, 1949.

TABLE I.

Number of Patients	Age in Years	Cause of Amputation	Date of Amputation	Pylon Fitted Pylon Amputation	LOA Days Pylon	Prosthesis Devised by Pylon Fitting	Condition of Stump at Time of Fitting of Prosthesis	Revision After Fitting	Abnormal Gait on First Day
1	56	Arteriosclerosis obliterans	2-26-48	75	18	64	asymptomatic	none	none
2	26	Trauma	7-3-48	75	0	68	asymptomatic	yes	none
3	38	Trauma	9-11-48	130	0	119	asymptomatic	none	none
4	28	GSW	old amputee	24	13	29	asymptomatic	none	none
5	31	Acute arterial occlusion, post surgery	9-1-49	48	82	105	asymptomatic	none	none
6	29	GSW, osteomyelitis	10-26-49	63	90	105	asymptomatic	none	none
7	58	Trauma	old amputee	no revision	0	60	asymptomatic	none	none
8	57	Trauma	old amputee	no revision	0	30	asymptomatic	none	none
9	31	Trauma	old amputee	24	3	no prosthesis	asymptomatic	none	unknown
10	26	Osteogenic-sarcoma	5-22-48	54	88	90	asymptomatic	none	none
11	33	Osteomyelitis	3-19-48	60	26	64	asymptomatic	none	none
12	23	GSW, osteomyelitis	9-23-49	39	60	71	asymptomatic	none	none
13	69	Arteriosclerosis obliterans; diabetes	old amputee	26	0	33	recurrent tenderness	none	none
14	38	GSW, painful stump	old amputee	64	30	50	old painful stump	none	none
15	24	Osteomyelitis	3-24-48	40	30	59	asymptomatic	none	none
16	51	Thromboangiitis obliterans	4-11-49	65	63	90	asymptomatic	none	none
17	20	GSW, gangrene	3-22-49	50	90	107	asymptomatic	yes	none
18	49	Osteogenic sarcoma	5-14-49	33	60	110	asymptomatic	none	none
19	71	Arteriosclerosis obliterans	7-11-49	67	6	80	asymptomatic	none	none
20	71	Osteomyelitis	old amputee	no revision	3	no prosthesis	asymptomatic	none	none
21	60	Acute arterial occlusion, post surgery	10-22-48	61	49	63	asymptomatic	none	none
22	52	Embolism	6-2-49	46	88	90	asymptomatic	none	none
23	56	Thromboangiitis obliterans	11-29-49	60	30	70	asymptomatic	none	none
24	57	Embolism	11-22-49	66	15	73	asymptomatic	none	none
25	30	Trauma	2-17-50	42	6	30	asymptomatic	none	none
26	39	Thromboangiitis obliterans	11-18-49	34	120	150	recurrent edema	none	none
27	58	Osteomyelitis	3-27-50	38	15	90	asymptomatic	none	none
28	27	Osteomyelitis	2-9-50	61	75	40	asymptomatic	none	none
29	56	Arteriosclerosis obliterans; diabetes	9-12-48	58	3	30	asymptomatic	none	none
30	55	Thromboangiitis obliterans	old amputee	25	0	110	asymptomatic	none	none
31	63	Arteriosclerosis obliterans	6-8-48	76	66	156	asymptomatic	none	none
Averages: 43.1				53.8	36	76.07			

of these patients following fitting with the permanent prosthesis was excellent. In fact, the training period for the proper use of the permanent prosthesis was significantly shorter in the pylon fitted patients than in those patients who had been permitted ambulation with crutches alone. This shortened training period contributes to the economy of pylon use. Despite the crude appearance of the pylon, it was accepted by the patient. In fact, the patients looked eagerly forward to being able to wear the pylon and to walk on "two legs."

Two patients required revision of the stump following use of the pylon. One revision was necessitated because of recurrent small ulcers in the post-operative scar; the other revision was due to healing of the wound by secondary intention. In the opinion of the orthopedic surgeons neither revision was necessitated because of the construction or use of the pylon.

Conclusions

1. Thirty-one consecutive amputees were fitted with a pylon while awaiting the permanent prosthesis.
2. No unfavorable consequence was occasioned by the use of the pylon.
3. The abduction gait, bulbous, sensitive stump, and poor pattern of locomotion emphasized in the literature was encountered in no instance.
4. The pylon was acceptable psychologically to the patient.
5. The pylon is durable, easily fabricated, and cheap in initial construction.
6. Replacement of the pylon bucket and lining is cheaper and simpler than similar changes in the permanent prosthesis.
7. Since most of the stump shrinkage occurred while the pylon was worn, its use should not be terminated too soon.
8. Use of the pylon enabled return to gainful work while awaiting the permanent prosthesis, a circumstance not always possible with the use of crutches alone.



NEEDS OF THE ARMY IN PHYSICAL MEDICINE

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TAKOMA PARK, MD.

The term "need" presents many facets. It is frequently expressed in the military service as requirements. First, this paper will discuss requirements as to the total personnel needed for the Physical Medicine Service, as an ideal requirement; secondly, the minimal requirements of the service. The solution will be found somewhere between the ideal and minimal and this will be based upon availability, which in itself is another subject and is what we are in reality dealing with to meet the needs in the Service.

The requirements of the Army Medical Service in physical medicine as of June 30, 1951 are 59 position vacancies for medical officers in physical medicine; 146 for physical therapists; 155 for occupational therapists; and 17 for physical reconditioning officers. To fulfill many of these position vacancies on a minimal requirements basis, one would meet the need by allocating personnel to the most critical shortage areas as the personnel becomes available. Then we find a minimal program which is frequently recognized as a nominal service.

The U. S. Army, in its Class II installations, which are under the Surgeon General's supervision, has 11 services of physical medicine to which there are 33 medical officers assigned. This is the present assigned physician staff available to present a program that is not nominal as a service. This is not an ideal service; however, it is not just a nominal service. It is the available service. Twelve of these officers are in the resident training program and of these twelve, four will finish the three years residency training as of July 1, 1951. They will, of course, then be available for assignment to vacancies. This brings us to the discussion of availability.

Two factors appear to me to be quite pertinent; these are the quantity that are available and the quality of those available. Certainly, in discussing quality we simply mean that we have competent medical officers and efficient technical personnel in order to meet the needs of the service. As for quantity, one should remember the background concerning physical medicine. Before World War II, there was a definite shortage of physical therapists and occupational therapists. As for the physicians in the field, the real impetus for their need dates back seven years. World War II demonstrated the effectiveness of the physical treatment for those disabled. The Surgeon General established physical medicine as a service at the end of the war. Since then, a few medical schools have stressed in their teaching programs the importance of adequate treatment of acute diseases and injury toward prevention of chronicity, the deformity and residual disability, as well as the care of the chronic conditions. Likewise, the utilization of the handicapped, coupled with the economic and social factors of rehabilitation has been stressed. Since then physicians in other specialties have desired more and more that physical medicine be made available to patients. Thus, it has become good policy to provide total care of the patient, thereby increasing the need in the field.

There is a shortage of trained personnel in all categories of the physical medicine program, both military and civilian. To think of this subject of "availability versus need" from a purely military view is impossible. One must remember the effect of procurement. There is a staggering number

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needed in the civilian field and veterans facilities. It seems quite apparent then that the number presently in the country is insufficient for our needs, civilian or military. We must get along with what we have. The problem will be significantly increased by our steadily expanding forces. This expansion will create pressure toward accelerated education to meet the need. Accelerated education will offer the temptation of cutting one corner after another and may lower the standards in the effort to meet this increased demand. This would affect the patient who needs the care. Accelerated training programs, likewise, may allow inadequately trained personnel to enter the field. Recognizing that in the past ten years there has been a shortage of physical medicine personnel and that it is apparent that the number presently in the country is insufficient for our needs, civilian or military, together with the fact that the military service will, for some time, be required to staff somewhere between 40 and 80 per cent, it is apparent that there is a need either for an accelerated program or for more people to enter the field on a long range plan.

Lest I be misunderstood as to my considered minimal program of the physical medicine service, may I state that I oppose the organization of physical medicine in a hospital as a nominal service, with one officer in charge. It is not a workable concept. No man can practice medicine simply because he has been given a title and a duty assignment, which in short confines him to a desk, and yet be expected to implement a good, sound, desirable program for a patient.

Of course, this is related to a doctor-patient workload tolerance figure. May I quote Dr. Rusk: "We cannot accept unquestioned the diagnostic evaluation and therapeutic prescriptions of our colleagues without a re-evaluation if we are to accept the responsibilities of specialized care." I have always stressed this point by stating that when your consultative and diagnostic opinion is as much accepted as your therapeutic procedure, then you are a recognized specialist. However, for one medical officer to give proper supervision and direction, as well as diagnostic and consultative opinions and prescriptions, additionally to being required to run a large service with many personnel and administrative problems, is asking for more than appears to be logical.

Since the Korean emergency, the Army has opened quite a number of Class I installations which are under our varied Army Areas and are classified as specialized treatment hospitals. Here there are approximately twenty medical vacancies; the need for physical therapists and occupational therapists is also acute. The most important need here is one of quality. These Army hospitals, as mentioned above, are utilized for specialized care, and here the need of these installations presents the problem of a special quality in order to implement their special program.

Attention is called to some of the merits of the physical medicine program as presently implemented in the Armed Forces, for in a sustained physical medicine program for the past five years, there must have been a reason for our need. It is a little over four years ago that Army Physical Medicine was established by the then Surgeon General, Major General Norman T. Kirk. The service should have a feeling of elation and pride in the venture then instituted and continued to this day. We have always nourished the hope that the quality of care for the patient should increase. The survival of physical medicine involves evolution of thinking in medicine; this is true in the Army as it is elsewhere.

During the past war the accomplishment of Physical Medicine in caring

for the health of the disabled and handicapped, wounded on the battlefield or elsewhere, have been acclaimed worthy of high praise. The position of Physical Medicine might deteriorate unless our special skills be increased or held to a high level. Certainly, the past performance has been for the good of the patient. Our intent is even better care for the sick and injured. Proponents of Physical Medicine must be aware that our collective errors as a group, either in the Army or elsewhere, may be, and often are magnified and thus used to obscure the achievements that we as a special group have made. A member of the Armed Forces, the same as a general member of society, demands and obtains the benefits of modern progress in medicine. These soldiers are impressed by, and duly grateful for, the benefits of modern progress in medicine. They are, likewise, quite aware of errors in medical science and many of them will immediately recognize false programs. General Kirk recognized physical medicine as a need and implemented it as a service making it available to the soldier. The Army must be ready to treat with the immediate need of the handicapped. The Army also must exercise the ability to treat disease entities from the standpoint of future handicap and disability. We, in physical medicine, can gain popularity not by the numbers to which we apply it, but by the end result of improving the lot of that number. We rise or fall by application of efforts directed toward relief of the sick and wounded; the prevention of deformity; the correcting of disabilities or the improvement of those already disabled. We must meet an individual need in order to remain in a program. We must not develop the absurdity of too small or too tiny fragmentation of a specialty; nor must we lose ourselves in the field of rare and uncommon diseases. We must fit our program around the needs of the patient upon whom it is practiced. We are not needed solely for the application of diathermy, or for a program of progressive resistance exercises, but rather as competent physicians who must deal with the forces that shape the patient's life. Of course, there is enthusiasm for specialization, but there is likewise danger of isolation. Dr. Rusk's views on rehabilitation are worthy of support. The Army now sends the chronic rehabilitation patient to the Veterans Administration. However, the Army needs to enforce rigidly the concept of physical medicine as a specialty; not that its interests are separated from any other group, but that an Army program should be directed toward military rehabilitation and utilization. No specialty group can justify itself unless it contributes to the advancement and knowledge of medicine, maintains and develops to a high degree the technique peculiar to its field and develops techniques that help the patient. "We exist not through emphasis on a ritual or a technique. We do exist as long as our ritual or technique is needed by the patient."

The physical medicine program in our large Army hospitals enables other members of the staff to judge the treatment programs of their fellow members. Here patients are followed and treated long enough to completely determine whether or not the treatment has been successful; here, too, it is often determined that a treatment program is unsuccessful. Thus, if constructive programs are continued, recurrence of such failures is prevented. This would seem then to meet the need of the patient. The Army, thus, has an ideal for a program in physical medicine. It is presently being implemented on the basis of availability of personnel requisite to needs.

There is a shortage of trained personnel in all categories of the physical medicine program, both military and civilian. We must get along with what we have. The expansion of the Armed Forces will steadily increase the need. In conclusion, it is pointed out that there is a real need for more people to

enter the field for training on a long range plan and one may add, there is certainly, an acute need for an accelerated program. This must not be forgotten.

The patient in the Armed Forces has demanded skilled, competent and efficient personnel for his care. We are proud of the record physical medicine has made in the Army. It is certain that our attitude of unselfishness in striving toward a single goal in the end will merit no criticism and it is our hope that it will be worthy of some praise.

GALVANISM IN THE TREATMENT OF ECCHYMOSIS

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One of the most common injuries encountered in a neuropsychiatric hospital is the so-called "black eye." While this in itself is not, as a rule, a severe injury, it is disfiguring, and untreated may well last from ten to fourteen days.

As with most conditions which are difficult to treat, a multitude of popular remedies have been used for treatment, such as hot or cold (or both) compresses. The results, however, were usually poor. In the early days of Physical Medicine massage was tried and although theoretically indicated, in actual practice massage was, to most patients, too painful to be tolerated. However, with the wider use of electrotherapy, one form was found to be particularly effective, namely, the "Static Brush Discharge" which owes its effectiveness to the pronounced decongestive action of this current. However, excellent for this and other contusions, this form of treatment never became very popular, because of the many disadvantages inherent in the Static Treatment — that is, the apparatus is very cumbersome, completely filling a fair sized room. It is extremely bulky, and to most patients it presents a truly terrifying appearance because of its spark and noise. The last fault alone practically contraindicated its use in neuropsychiatric hospitals.

Galvanism, although not as powerful a decongestant, possessed none of the disadvantages of the Static Machine, with the additional advantage of being portable; and with the use of a battery it could be used where no electric current was available. The authors were unable to find just when or where the use of galvanism for ecchymosis of the eyes and ears was first begun, but one of them has used it for over fifteen years. We have found it a definite improvement over other forms of treatment for ecchymosis of the eyes. At first it was found that while some cases showed little, if any, improvement; in quite a few cases one treatment would completely eradicate any evidence of injury. It was found that in those cases sent to the Physical Therapy Clinic soon after injury, one treatment would suffice to clear up

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this condition. When treatment was delayed until development of the typical "black eye," e. g., dark discoloration with pronounced swelling, galvanism, although hastening recovery, had lost a great part of its value.

From May 1, 1947 to April 30, 1948 approximately fifty cases were treated by this method. Forty of these were treated within one hour of receiving injury and needed only one treatment to avert "black eye." Three cases of a duration of one and one-half hours after receipt of injury were treated at one time, and although one of the writers who administered the treatment fully expected the need for one more treatment, examination showed that all of them had cleared up completely. On reporting for treatment after the injury, all had considerable swelling and redness and one had a slightly dark discoloration over a rather large swelling. Five more of them received two treatments. One received four treatments and it was found that his injury occurred two days previous to treatment.

The technique for the treatment of ecchymosis of the eyes is simple. A large dispersive electrode is placed under the back, below and between the scapulae. The patient lies on a treatment table. This position of the patient and electrode is preferable for a neuropsychiatric patient in order to prevent any dislodgment of electrodes with consequent unpleasant shock to the patient. A small electrode, depending on the size and site of injury, is placed over the eye and retained in place with an "Ace" bandage and is connected to the anode or positive pole. The current is turned on very slowly and gradually up to five or six milliamperes, depending upon patient's tolerance, and kept at a minimum current for about twenty minutes. At the termination of the treatment the current is gradually reduced to zero and turned off. If this rule is disregarded there may be shock or even syncope.

When the trauma has occurred a considerable time before treatment has commenced, marked swelling with dark discoloration occurs. In this instance, the treatment is changed by using the negative current for approximately fifteen minutes, followed by an application of positive current. The duration of the positive current is reduced to five minutes accordingly. Here use is made of the vasodilating property of the negative pole, followed by the anode or vasoconstrictor property of the positive pole.

It must be emphasized that the electrodes are to be kept constantly moistened ready for use at all times. This is necessary in order to permit good conduction of current, and to overcome skin resistance; complete moistening of electrodes will offset any unpleasant sensation to patient because of insufficient "wetting" of pad. We generally use ordinary warm tap water as a moistening agent or warm 1% saline solution. A comfortably warm solution is important for its soothing effect, which is especially worthwhile in treating acutely disturbed patients with contusions or ecchymosis of the eyes.

It is our experience that when the treatment is given carefully there is little or no discomfort. In fact, some patients will actually sleep during the treatment.

Summary

1. Galvanism in early treatment of ecchymosis is effective.
2. For this treatment to be fully effective it must be given before a definite hematoma with its dark discoloration is fully established.
3. While there is considerable controversy over the polar effects, clinically at least, the positive pole seems to constrict, while at the negative pole there is a dilating of blood vessels.

Conclusion

The use of galvanism in neuropsychiatric hospitals for severe trauma to the eyes should be standard practice in all neuropsychiatric hospitals. Our results indicate that prompt and immediate treatment after injury will prevent the associated ecchymosis and swelling. It is simple, practical and effective.

AN OVER-BED READING DEVICE *

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EARL CLIFTON **

Introduction

In the rehabilitation of quadriplegic spinal cord patients, the problem of developing devices to facilitate rehabilitation activities frequently arises. One device found to be useful in the Long Beach Veterans Administration Hospital is the "over-bed reading device," which is useful to patients having limited use of the upper extremities. It makes reading possible without calling for continuous ward attendant services.

Description

The "over-bed reading device" is made from materials usually available in hospital stock. Most utility departments have the skill to construct this device. Construction time is about two hours and materials cost about \$6.00.

The device is adjustable both longitudinally and horizontally, thus making it adaptable to the reading comfort of the patient. The reading board is attached to the overhead frame in a manner that permits quick and easy movement from a using position to an out-of-the-way position and vice versa by simply turning it up or down. (See figures 1 and 2.)

The device in no way interferes with the normal use of the link chain tube, "patient's helper," used by the partially paralyzed patient for lifting himself from the bed to wheelchair and from the wheelchair to the bed, or in changing his position in bed. Such patient helpers have been in use in the Paraplegia Service of Birmingham Veterans Administration Hospital and Long Beach Veterans Administration Hospital for several years. The "over-bed reading device" is attached to a "patient's helper" double. It can be used at night by the attachment of a light to the overhead tubing.

Material and Construction

Material

One patient's helper as described on pages 2 and 3 of U. S. Standard Form 36, Supply Contract; two $1\frac{1}{8}$ x40 in. mechanical tubing; one $1\frac{1}{8}$ x26 in. mechanical tubing; two $\frac{1}{4}$ rod x 15 in. steel rod; four $\frac{1}{2}$ -20 machine nuts;

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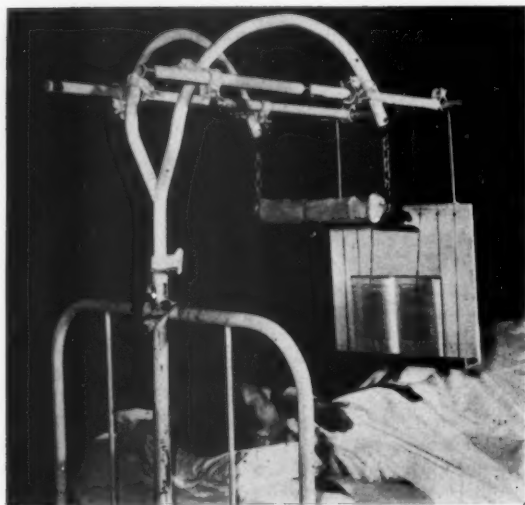


Fig. 1. — Reading device in use.



Fig. 2. — Reading device turned up out of the way for nursing care.

one $\frac{1}{8}$ x1 in. flat steel; four double swivel tubing clamps; two single tubing clamps; one standard clip-board clamp; one $\frac{3}{8}$ x16x18 in. plywood; one $\frac{1}{2}$ x2x16 in. soft wood; one $\frac{1}{2}$ x $\frac{3}{4}$ x16 in. soft wood.

Construction and Assembly

1. Procure materials listed above. 2. Braze or weld single tubing clamps to ends of 40 in. tubing. 3. Assemble to patient's helper, using 4 double swivel tubing clamps. 4. Drill $9/32$ in. holes $17\frac{1}{2}$ in. apart equivalent from ends of 26 in. tubing. 5. Thread $\frac{1}{4}$ x15 in. steel rod $\frac{1}{4}$ in. — 20 on one end of each piece. 6. Flatten opposite end of each $\frac{1}{4}$ in. steel rod. 7. Braze or weld flattened ends of $\frac{1}{4}$ in. steel rod to ends of $\frac{1}{8}$ x1 in. flat steel. 8. Drill four $3/16$ in. holes equally spaced on $\frac{1}{8}$ x1 in. flat steel. 9. Cut plywood to size. 10. Construct $\frac{3}{4}$ x2 in. lip on inside lower edge of plywood. 11. Sand all edges. 12. Drill holes for rubber bands. 13. Attach clip-board clamp in top central position of inside of plywood board. 14. Clamp $\frac{1}{8}$ x1 in. steel to top outside of plywood board. 15. Drill holes through plywood, using holes previously made in $\frac{1}{8}$ x1 in. steel as guide. 16. Secure plywood to $\frac{1}{8}$ x1 in. steel. 17. Secure vertical rubber bands in place. 18. Assemble $\frac{1}{4}$ in. rods to $\frac{1}{8}$ x26 in. tubing. 19. Assemble tubing in single tubing clamps. 20. Paint.

Application of Over-bed Reading Device

This device makes it possible for patients to read without excess strain or effort. If he has some use of hands, the patient can turn pages for himself. If patient is unable to turn pages, he will need some assistance from ward attendant. However, if reading is attempted without this device, attendance will be needed during entire reading period, in order to turn pages and hold the reading material. With this reading device, attendance will be required only at intervals. Thus ward attendants may spend time with other patients while giving only a fraction of their time to the reading patient.

This device has been in operation at Long Beach Veterans Administration Hospital for a number of months and with several patients. It has proved helpful both to the patient and the ward attendant. At times when nursing care or medical examination is necessary, the board is easily and quickly turned up out of the way.

Summary

1. A need for a simple and economical over-bed reading device was met by the designing and construction of the device described in this paper.

2. This device has been in use for a number of months with paralyzed patients and has proved useful to these patients in their rehabilitation programs.

3. This device has proved to be time-saving in the use of ward personnel.



CIVILIAN REHABILITATION IN A CENTER AND IN THE COMMUNITY

(With Particular Reference to the Economic Aspects)

JOSEPHINE J. BUCHANAN, M.D.*

WASHINGTON, D. C.

The approach to the needs of the disabled individual is of necessity, one of group effort. Just as some benefits can accrue to us from individual and localized limited efforts, so, too can the disabled benefit from any efforts whatsoever which are in his behalf and for his good. But these individuals, like all others, can achieve the greatest benefit through the coordinated use of all factors and forces concerned with his well-being.

Much attention has been given of late to the proper definition of a rehabilitation center, whereas we might better concern ourselves with whether or not we are making available to the individual all of the opportunities for well-being which may result from the elimination or reduction of his handicap to the fullest possible extent, and from making available to him all of the other services of a rehabilitation agency. If all of these things can be secured within the community as a coordinated service, then the community is itself a rehabilitation center. However, the community is not as yet geared to the solution of the problem, either in services needed, or in the provision of a coordinated group or agency for the best application of these services to the needs of the disabled individual.

There, we recognize the need for group action. And thus the greatest benefit to the disabled individual is accorded through group effort, securing the best professional personnel, individual agencies, and physical equipment. At the same time, this aggregation of knowledge, skill and experience can serve individual communities as a teaching and research center from which may radiate improved knowledge and skills for localized use.

In 1945 the Vocational Rehabilitation Service of the State of Virginia began plans for the establishment of a Center which would meet the needs of disabled individuals at a reasonable cost. The first step in the achievement of this goal was accomplished with the acquisition of a portion of the former Woodrow Wilson Army General Hospital. The remaining two-thirds of the 150 buildings and property was acquired by the Augusta County Board for a large (1200 pupils) high school and for a regional trade school. The transfer of the property was accomplished in July, 1947. At the time of transfer the entire property was appraised as having a replacement value of \$7,500,000. Furniture and equipment valued at \$350,000 was also transferred. There are 229 acres of land surrounding the buildings.

The Center is organized under a Supervisor, with associate supervisors in four areas of responsibility, namely: 1) business management, 2) counseling and guidance, 3) medical services, 4) vocational training and sheltered employment.

The facilities of the Center comprise an administration building, five buildings for medical services, dining hall, dormitories, classrooms, recreation hall, activities building, conference hall, chapel, guest house and staff apartments.

* Consultant in Physical Medicine, U. S. Office of Vocational Rehabilitation; Former Director of Medical Services, Woodrow Wilson Rehabilitation Center; Former Assistant Professor of Clinical Physical Medicine, Medical College of Virginia, Richmond, Virginia.

* Medical Officer, Public Health Service, Wash., D. C. Chief of Physical Medicine and Rehabilitation, Gallinger Municipal Hosp., Wash., D. C. Asst. Prof. Phys. Med. and Rehab., George Washington University Hosp., Wash., D. C.

For various and obvious reasons, it was early decided to use the word student in referring to a disabled person being trained and treated at the Center.

The vocational counseling and guidance department has a twofold function. Since most students coming to the Center already have vocational plans, worked out by their local rehabilitation counselors, the guidance department at the Center serves only to review the plan as submitted, making sure to enroll the student in the proper courses, and to orient him to his situation at the Center. Some students, however, need special guidance procedures and thus a much more intensive and varied diagnostic study is undertaken at the Center. In this study, additional medical information and diagnosis, additional psychological testing, and, in many instances, exploratory periods in various classes are used to get the best possible evaluation of the potentialities of the disabled student. Thereafter, weekly joint conferences of all concerned are held to continue the evaluation of the student as he pursues his medical and training programs. All students enrolled at the Center obtain the counseling required for satisfactory personal adjustment at the Center and in the home community.

The vocational training department of the Center now has available courses in shoe repair, electrical appliance repair, radio repair, watch repair, sewing, upholstering, auto mechanics, business education, cosmetology, laundry, cooking and baking, arts and crafts production, nursing aid, and on-the-job training. Those who require it are enrolled in vocational training classes and in the medical service concurrently. They may attend classes in wheel chairs or on stretchers, and in many instances special facilities are designed and constructed to meet the needs of a severely handicapped person. These alterations from a usual working and living situation, however, are never resorted to unless the individual cannot meet the demands of the situation after intensive efforts on the part of the medical service to train him to meet such demands.

The medical service of the Center is concerned with supplying such treatments and skills as will produce for the handicapped individual the fullest possible functional usefulness of his body. This phase of the program includes not only medical care for the student's general health, but also a comprehensive program of physical medicine and rehabilitation procedures. This is accomplished with every known type of modern physical therapy equipment, and, more important still, by intensively trained and specialized physical therapists under the direction of a physiatrist. These are augmented by nurses and aides who have received special training at the Center in rehabilitation techniques, and by a qualified speech therapist.

The medical service comprises two infirmary buildings, two physical therapy buildings, speech therapy rooms, laboratory, x-ray, examining rooms, doctor's offices, and a dental clinic. All buildings are large and there is ample room for future expansion. The infirmary serves to house those students with minor intercurrent illnesses, and those severely disabled individuals who have not yet mastered the performance of those activities demanded by independent daily living. Students who have major illnesses or who require further hospitalization for purposes of corrective treatment or surgery are referred to various hospitals, depending upon their own choice or that of their referring physicians. As soon as the student has mastered the performance of the activities inherent in daily living he is transferred to a room of his own in one of the dormitories.

Admission of a student to the Center is through his local vocational rehabilitation service. A thorough study of each applicant is made by the field

supervisor of the rehabilitation service to determine eligibility. Acceptance at the Center is determined by the supervisor in conjunction with the various services after examination of all submitted material. This material includes information on all aspects of the case, including general and specialized medical reports. There must be established a favorable prognosis for successful training and/or treatment. In addition, there must be established a good possibility of successful employment following completion of services at the Center. Before and during the student's stay at the Center, he must give evidence of willingness to apply himself to the best of his ability.

Every student admitted to the Center is given a complete and thorough examination by the physician. This is followed by an evaluation period by the physical therapist and/or speech therapist. Following this evaluation, a program is planned to meet his individual needs. Where the medical problem is the primary one, the training program is planned around it, but when improvement warrants, the training program takes precedence and the medical program is built around it. Both programs continue concurrently to completion. Weekly conferences of medical personnel are held to discuss students' programs and progress. The physiatrist is present at all times to guide the entire medical program.

Consulting specialists in all phases of medicine are readily available and utilized, some coming to the Center routinely and others on call. The hospital of the University of Virginia is used for extensive diagnostic procedures requiring a period of hospitalization. Prosthetic appliances and braces are made directly under the supervision of the physiatrist and the therapists.

Student activities at the Center include a Student Organization, Sunday School and Church, a recreation program under a trained recreation director, a student publication and a supervised study hall. House Mothers and House Fathers reside in the dormitories.

Since the first student was admitted in November of 1947, over 700 have passed through the Center. Of this number approximately 75 per cent have received medical services and physical restoration procedures. At the present time there are 220 students enrolled. Since all programs are completely individualized, this is a constantly fluctuating number, with many coming and going each week. The disabilities of these disabled students encompass almost the whole of medical nomenclature and vary from the simple disability which can be successfully treated in a few weeks to those of the severest degree which may require a year to 18 months for the achievement of the greatest possible improvement.

The funds for operating the program at the Center and for developing its various facilities come from four principal sources:

(a) State-Federal vocational rehabilitation funds paid to the Center for specific rehabilitation services furnished clients of the rehabilitation agencies. This is the major source of revenue.

(b) Payment from private sources such as insurance companies, United Mine Workers of America, National Foundation for Infantile Paralysis, etc.

(c) Specific grants from capital improvement funds of the State.

(d) Payments by students who are financially able.

The personnel at the Center at the present time numbers fifty-one employees who are distributed as follows:

(a) *Administration*. — Supervisor, Assistant Supervisor, Accountant, Clerk, Secretary.

(b) *Supervision*. — Assistant Supervisor, Secretary, Recreation Director, House Mother, House Father.

(c) *Medical Service*. — Physician, Physical Therapists (five), Orderlies (two), Attendant, Nurses (two), Speech Therapist, Secretary.

(d) *Operation and Maintenance.* — Building and Grounds Superintendents (four), Steam Fireman (three), Housekeeper, Janitors (three), Maids (three), Inventory Clerk.

(e) *Dining Hall.* — Dietitian, Assistant Dietitian, Cooks (three); Kitchen Helpers (seven), Janitress.

The Center operates at cost and at the present time that cost is being met through its charges for services rendered. All departments are now meeting these costs with the following charges:

(a) Room and board.....	\$45.00 per month
(b) Tuition —	
Virginia students	25.00 per month
Non-Virginia students	35.00 per month
(c) Medical fee	2.50 per month
(d) Physical therapy —	
1 hour —	
Rehabilitation clients	2.00 per day
Others	3.00 per day
1 hour to ½ day —	
Rehabilitation clients	3.00 per day
Others	5.00 per day
½ day to entire day —	
Rehabilitation clients	5.00 per day
Others	8.00 per day
(e) Attendant fee	1.00 per day
(f) Books, tools, prosthetic appliances as required by the individual.	

The average cost per day for a student is now at approximately \$4.50. Thus a six months program for a severely disabled person may cost as little as \$800.00. Translated into economics this means then that for the same amount of money which would have been spent to maintain a totally disabled person for one year on a constantly recurring cost program of community participation, he may be rehabilitated and returned to his community as a wage earner and a tax payer. This, then in purely economic terms, represents a sound investment. Little more need be said concerning the humanitarian values involved.

The keynote to such a program as this is, of course, the team approach. Porter has well said: "To bring about such coordination of functions and continuity of services requires a person specifically trained to accept the responsibility of understanding the handicap and adapting the services for meeting it. The more highly specialized the various team members become, the more necessary this service of coordination becomes. To the extent that he possesses sound professional preparation will the rehabilitation counselor be recognized as the logical coordinator of resources in behalf of the disabled, at least of those whose objective is remunerative employment. . . . It is not the maintenance of prestige of a particular profession that matters; it is the contribution of that profession to solving the complex problems of the individual who has handicaps. . . . Agencies do not rehabilitate individuals, but individuals rehabilitate themselves, using the resources which agencies provide."¹

Where any set of factors in the rehabilitation of a disabled person outweighs any other in making available to that individual his best total rehabilitation, then our program falters and the individual suffers.

A Center can produce the greatest good for its individuals, only if all concerned work as a team. Where the team deals with individuals, the human factor — the basic dignity of the body and spirit of the individual — is as important to the rehabilitation center, as it is to Democracy itself.

1. Porter, Edgar B., Assistant Chief, Guidance, Training and Placement Branch, U. S. Office of Vocational Rehabilitation: "What Is Rehabilitation?" *Journal of Rehabilitation* XVI: 4, July-August, 1950.

MEDICAL NEWS

March of Dimes Grant to American Physical Therapy Association

An award of \$18,262 to the American Physical Therapy Association has been announced by Basil O'Connor, President of The National Foundation for Infantile Paralysis, which will enable the Association to include a continuing study of home care plans for polio and other patients in its educational program. It will also be possible now to recruit more students for physical therapy training, to make more effective the professional training of the students, to provide visual aids and instructional material to meet the needs of graduate physical therapists in providing better care for poliomyelitis patients, and to improve personnel practices in the field.

Academy Annual Meeting

The American Academy for Cerebral Palsy announces that its Annual Meeting will be held in Boston, Massachusetts, at the Copley Plaza Hotel, on Friday and Saturday, November 16 and 17, 1951. The Friday afternoon scientific session will be open to all interested physicians and the program will include:

"The Cerebral Palsy Problem in 1951," Bronson Crothers, President.

"Physiology of Motor Learning as Applied to Cerebral Palsy," Frances Hellebrandt.

"Studies of Gait Patterns of the Hemiplegic Patient," Morton Marks.

"Surgical Methods for Functional Improvement of the Hand in Spastic Paralysis," William Cooper.

"Diastematomyelia," Franc Ingraham.

"Paradoxical Benefit of Cortical Ablation for Selected Hemiplegics," Wilder Penfield.

National Society Convention

The National Society for Crippled Children and Adults will hold its annual convention at the Palmer House, Chicago, October 3-6, 1951.

Grant Awarded

Alpha Chi Omega, women's sorority, has granted \$10,000 to continue a nationwide education program for specialists in cerebral palsy to the National Society for Crippled Children and Adults, Chicago. Advanced study in the care and treatment of cerebral palsied children by physicians, therapists and educators will be made possible.

Personals

Dr. Robert L. Bennett will present the topic "Physical Medicine in Poliomyelitis" at the Second International Poliomyelitis Conference being held in Copenhagen, Denmark, from September 3 to 7, 1951.

Dr. Howard A. Rusk has been elected Chairman and Dr. Walter J. Zeiter the Secretary of the Section on Physical Medicine and Rehabilitation of the American Medical Association for the 1951-52 period.

Dr. F. A. Hellebrandt has been reappointed to the Editorial Board of the Journal of Applied Physiology, on which she has served for the last three years, at the invitation of the American Physiological Society.

Dr. Keith C. Keeler has recently been appointed to the staff of the School of Medicine of Western Reserve University. Dr. Keeler is now Assistant Professor of Physical Medicine and Rehabilitation.

Dr. Ralph E. DeForest, a Congress member, has been appointed Secretary of the Council on Physical Medicine and Rehabilitation of the American Medical Association. Dr. DeForest was formerly at Mayo Clinic.

Announcement

The University of Minnesota announces a continuation course in Physical Medicine and Rehabilitation to be presented for physicians on September 28 to 29, 1951, at the Center for Continuation Study. The course will stress the role of physical medicine in therapy in general practice. The care of fractures and arthritis will be emphasized. Symposia will be held on "The Care of the Hemiplegic Patient" and "Geriatric Problems."

National Society for Crippled Children and Adults, Inc., Adds Three to Staff

Harry V. Gilson, associate Commissioner of Education for the state of New York, has been appointed Director of Education of the society.

Mr. Gilson, one of the foremost men in the nation in his field, will be responsible for directing a nationwide professional and parental education program concerned with the problems of the crippled.

Miss Mary F. Pollard, who has won a wide reputation as a young and pioneering health educator in the New Mexico Department of Health, will join the staff of the National Society for Crippled Children and Adults as consultant in

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ARCHIVES of PHYSICAL MEDICINE

OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

∴ EDITORIAL ∴

TREATMENT OF RHEUMATOID ARTHRITIS

Of the many therapeutic methods which have been employed in the past in the treatment of rheumatoid arthritis, the physical agents have held and still hold an important place. Although they are not usually curative by themselves, they do aid materially by relieving pain, increasing joint mobility, improving morale, and assisting in the patient's general rehabilitation.

The adequate treatment of rheumatoid arthritis is a program rather than the exhibition of a single isolated remedy or procedure. It must be fitted to the patient's individual needs, not only from the standpoint of the disease, but also according to his social and economic status. It should consist of the best possible nutritional management with vitamin supplements, the indicated physical medicine and rehabilitation procedures, necessary analgesic and anti-anemic medication, possible blood transfusion, and cortisone, ACTH, or gold in properly selected cases. Help should be sought when needed from the orthopedist, otolaryngologist, and the dentist.

In the editorial column of the June, 1951 issue of the ARCHIVES attention was called to the fact that, although cortisone and ACTH produce remarkable amelioration of signs and symptoms in rheumatoid arthritis during the period of administration, they are not curative. They do, however, make possible much more adequate employment of the procedures of physical medicine and rehabilitation. In this respect they actually widen the scope of physical medicine in this disease. Polley and Elkins¹ several months ago emphasized the importance of exploring the possibilities of a combination of cortisone and ACTH with physical medicine and rehabilitation in the treatment of rheumatoid arthritis. For the patient whose response to the hormones is favorable, the physiatrist has much to offer in restoring muscle function. For patients with irreversible joint pathology, physical medicine can put the joint in the best possible functional state and improve muscle power. The patient who has been more or less completely crippled by the disease, can be taught to make the best use of what function he has left. To the patient who is intolerant to cortisone and ACTH, or relatively so, physical medicine still offers much relief.

In this issue of the ARCHIVES appears an article by Coss and Ragan²

1. Polley, H. F., and Elkins, E. C.: Significance to the Physiatrist of Recent Developments in Rheumatic Disease, *Arch. Phys. Med.* 32:146 (March) 1951.

2. Coss, J. A., and Ragan, C. A.: Combined Use of Cortisone, ACTH and Rehabilitation Techniques in Certain Arthritis Problems, *Arch. Phys. Med.* 32:572 (Sept.) 1951.

on the combined use of cortisone or ACTH and physical medicine in the treatment of patients suffering from severe long-standing rheumatoid arthritis. They have found that much more vigorous physical measures are possible in hormone treated patients with resulting increase in the range of motion and muscle power, relief of pain, and more complete rehabilitation. The interested reader should peruse this article.

It is well to remember that the results of gold therapy in rheumatoid arthritis may also be enhanced by the simultaneous use of physical measures. A few years ago Drewyer³ called attention to the combined use of gold and mild artificial fever in the treatment of this disease. He reported 59 cases of rheumatoid arthritis, 29 cases of rheumatoid spondylitis, and seven of combined spondylitis and peripheral arthritis. The author reported that 90 per cent of his patients with rheumatoid arthritis, 82 per cent of those with spondylitis, and 71.5 per cent of those with the combined disease showed complete remission or improvement. The writer also has used this method of therapy, since the appearance of Drewyer's report, with excellent results.

As Polley and Elkins² remarked, the early spectacular results in rheumatoid arthritis with cortisone and ACTH caused some apprehension regarding the future of physical medicine. It is apparent, however, that physical medicine still occupies and will continue to occupy an important place in the treatment of this difficult disease.

3. Drewyer, G. E.: Low Grade Fever Therapy as an Adjuvant in the Treatment of Certain Types of Arthritis, *Arch. Phys. Med.* 29:284 (May) 1948.



Medical News

(Continued from page 602)

community organization and health education. She will be associated with the community organization section of the professional field service of the National Society and in her work will assist state and local affiliates of the Easter Seal Agency in their organizational and health education programs.

Irene K. Rowland, Streator, Ill., nationally known volunteer in work on behalf of health and welfare agencies and the Parent-Teacher movement, has been appointed to the public education staff of the Society. Mrs. Rowland will assist in interpreting the service program for crippled children of the Easter Seal Agency to the general public and to volunteer workers throughout the country.

Scientific Broadcasts

At the request of the U. S. Department of State, tape recordings based on scientific exhibits or papers shown or read at the 1951 A. M. A. session, were made. Among these were: "Effect of Ionizing Radiations" by Anthony C. Cipollaro, M.D., and "Self-Help Devices for Rehabilitation" by Howard A. Rusk, M.D. They will be used for broadcasts to English-speaking areas overseas.

Bill S. 1463 Amended

Senator Humphrey has amended this bill by striking out word "physically" from phrase "physically handicapped" and including in the definition of handicapped children: "or who, because of mental defect existing from birth are incapable of managing their actions and affairs with ordinary prudence."

Accepted Devices

Aloetron Short Wave Diathermy, Model F8400. — Manufactured by A. S. Aloe Company, 1831 Olive St., St. Louis 3, Missouri, apparatus is a generator of short wave diathermy radiation of wavelength approximately 11 meters, frequency 27.12 megacycles. Designed for both medical applications and office surgery, it can be moved about on casters. The Council on Physical Medicine and Rehabilitation voted to include the instrument in its list of accepted devices.

Commonwealth Therapeutic Units. — Manufactured by the Commonwealth Sheet Metal Engineering Works, 36 Wall Street, Binghamton, New York, device is intended for the administration of fever therapy and for application of heat to large areas of the body. Available in Models 2 and 3 also, varying only in size. The Council on Physical

Medicine and Rehabilitation voted to include these units in its accepted list.

Linde Type R-501 Oxygen Therapy Regulator. — Manufactured by Linde Air Products Company, Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y., instrument is intended for use in clinical administration of oxygen in the hospital, the clinic, the physician's office, or the patient's home. The Council on Physical Medicine and Rehabilitation voted to include the apparatus in its accepted list.

Sylvania Sun Lamp, Model RS. — Manufactured by Sylvania Electric Products, Inc., 60 Boston St., Salem, Mass., this sun lamp is a completely self-contained bulb which can be screwed into the standard light socket. No transformer or reflector is needed, as both are contained within the bulb. The Council on Physical Medicine and Rehabilitation voted to include the Sylvania Sun Lamp, Model RS, in its accepted list.

Sanders Oscillating Bed (Vasoscillator). — Manufactured by the American Hospital Supply Corporation, 2020 Ridge Ave., Evanston, Illinois, bed was originally designed to aid the circulation in peripheral vascular disease. However, additional evidence has indicated that the apparatus could be used for limited periods of time in giving artificial respiration. The Council on Physical Medicine and Rehabilitation voted to recognize the potential usefulness of the device as an aid to respiration in poliomyelitis and similar conditions in addition to usefulness in circulatory diseases, and include the Sanders Oscillating Bed in its accepted list.

Flurolamp. — Manufactured by Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark 5, N. J., lamp is source of ultraviolet radiation designed for use in diagnosis. Radiation also described as Black Light. The Council on Physical Medicine and Rehabilitation voted to include the apparatus in its accepted list.

Helio-Therm, Model F. — Manufactured by Ultrad Laboratories, 208 Maplewood St., Watertown 72, Mass., apparatus is a generator of radiations including the near ultraviolet, the visible and the near infrared wavelengths. Although, in the opinion of the Council on Physical Medicine and Rehabilitation critical evidence has not been produced to prove that the radiation from a "super-heated" tungsten filament lamp has superior qualities, it was voted to include the Helio-Therm, Model F in the accepted list as a local applicator of radiant heat.

John M. Mulvey

It is with regret that we announce the death of John M. Mulvey of Wauwatosa, Wisconsin. Dr. Mulvey was a Congress member for many years.

Newly Registered Therapists

August 2, 1951

- Anderson, Esther, 308 Delmar Ave., Winslow Terr., Vallejo, Calif.
 Barnett, Irvin, 107 W. Lane, Apt. 576, Vallejo, Calif.
 Beam, J. Milton, 44 Iroquois, Battle Creek, Mich.
 Bogen, Oliver, 5101 28th Ave. S., Minneapolis 17, Minn.
 Bostrom, Glenn, 3104 S. Holmes, Minneapolis, Minn.
 Clarke, Dorothy, 503 N. Broad, Clinton, S. C.
 Cummings, Jean, 3422 S. Gramercy Pl., Los Angeles, Calif.
 Davis, Howard, Rte. No. 1, Box 93, Ferndale, Wash.
 Erickson, Donald, 3720 Cedar Ave., Apt. 1, Minneapolis, Minn.
 Freeman, Gertrude, 514 Third Ave., Two Harbors, Minn.
 Gressett, John, 414 Williams St., Apt. 203, Vallejo, Calif.
 Harpole, John, 807 Missouri Ave., Deer Lodge, Mont.
 Hedgecoke, Robert, P. O. Box 11, Stinnett, Texas.
 Holbrook, Earl, 2303 Lake St., San Francisco, Calif.
 Jaeger, D. LaVonne, 1006 8th Ave. N., St. Cloud, Minn.
 Journey, Thomas, 827 King St., Chadron, Nebr.
 McArdle, Donna, 765 N. Wheeler, St. Paul 4, Minn.
 Merry, David, 836 S. Anderson, Tacoma, Wash.
 Miles, Harold, 737 S. 1st, Missoula, Mont.
 Morden, Marjorie, 604 W. Commonwealth Ave., Alhambra, Calif.
 Morris, Murray, 2600 Alameda St., Vallejo, Calif.
 Moulton, Idell, 2124 Como Ave., Apt. 104, St. Paul 8, Minn.
 Oden, Bertanne, 1786 10th Ave., San Francisco, Calif.
 Peters, Nicholas, 301 Williams, Apt. 308, Vallejo, Calif.
 Valentine, Constantine, 29 Fifth St. S. W., Chisholm, Minn.
 Watts, Harriet, 436 Geneva Ave., Melrose Park 1, Ill.
 Wood, Robert, University Village, N-8, Minneapolis, Minn.

August 25, 1951

- Accrocco, Joseph F., P. O. Box 545, VA Center, Dayton, Ohio.
 Allen, Woodson, H., P. O. Box 8, Cortaro, Ariz.
 Berkoff, Joan M., 3 Lathrop Lane, Norwichtown, Conn.
 Candela, Flora L., 170 Cocasset St., Foxboro, Mass.
 Cryan, Harriet L., 48 Hurd St., Melrose 76, Mass.
 Engelman, Melody J., 2600 S. Compton, St. Louis 18, Mo.
 Hogg, Margaret C., 4410 Roland Ave., Baltimore, Md.
 Kay, Irene M., 2432 S. St. Paul, Denver, Colo.
 Lake, Barbara M., 121 Mt. Vernon St., Arlington, Mass.
 Ray, Dorothea V., 910½ Boston, Muskogee, Okla.
 Resnick, Janis T., 432 New Castle St., Butler, Pa.
 Santee, William A., 124½ E. 64th, Tacoma, Wash.
 White, Theodora T., 93 Hartford Terr., New Hartford, N. Y.

Advanced Course in Physical Rehabilitation
Methods

As rehabilitation or the "third phase of medicine" has become more widely established as an integral part of medical care, the concept has also evolved "*not to disqualify the patient for what he cannot do, but rather qualify him for what he can do.*" This concept has placed greater demands upon the physical therapist in retraining the physically disabled. Since such retraining involves skills and methods which are not usually stressed in undergraduate physical-therapy training, the Institute of Physical Medicine and Rehabilitation of the New York University-Bellevue Medical Center, in conjunction with New York University School of Education, has established special four-week courses in advanced rehabilitation methods for physical therapists. The course is designed to give both didactic and practical instruction in testing and advanced training in the activities of daily living and the practical problems of ambulation, elevation, and self-care.

BOOK REVIEWS

PHYSICAL DIAGNOSIS. By *Ralph H. Major*, M.D., Professor of Medicine, University of Kansas, Kansas City. Fourth edition. Cloth. Price, \$6.50. Pp. 446, with 469 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W. C. 2, 1951.

This new edition contains sixteen chapters and is intended as a textbook for medical students. The introduction includes a brief historical review that gives meaning to the modern techniques and tools used in the art of physical diagnosis.

The ensuing chapters cover this subject from an anatomical standpoint following the usual sequence of an examination. Chapters VII and XII discuss the physical findings from the standpoint of diseases and the last chapter emphasizes the importance of history-taking and recording.

This book is richly illustrated with photographs as well as graphic material that facilitates understanding of the subject matter. Throughout the text there is historical reference to original work that makes interesting reading.

NUTRITION IN HEALTH AND DISEASE. By *Lenna F. Cooper*, B.S., M.A., M.H.E., Dean of School of Home Economics, Battle Creek College, Michigan; *Edith M. Barber*, B.S., M.S., and *Helen S. Mitchell*, A.B., Ph.D., Dean of the School of Home Economics, University of Massachusetts, Amherst. Associate Author: *Henderika J. Rynbergen*, B.S., M.S., Assistant Professor of Science, Cornell University-New York Hospital School of Nursing, New York. Eleventh edition. Cloth. Price, \$4.00. Pp. 744, with 133 illustrations. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5; Aldine House, 10-13 Bedford St., London, W. C. 2; 2083 Guy St., Montreal, 1950.

This is the eleventh edition of this book which would indicate its popularity and usefulness. This new eleventh edition has been completely revised and extensively rewritten in the light of rapid progress in nutrition during the last decade. Both the organization and treatment of the subject matter follow closely the Manual for Teaching Dietetics to Student Nurses, prepared by the American Dietetic Association.

The book is made up of four parts. Part I deals with the principles of nutrition with a new introductory chapter on a brief history of developments leading up to present day concepts of the science of nutrition.

Part II includes the latest developments in the dietary management of the sick and the convales-

cent. Special emphasis is given to the use of high protein diets in the treatment of liver diseases, other debilitating diseases and in convalescence. The sodium content of diets for liver and heart disease and in hypertension has been given special attention.

Part III, Food Selection and Preparation, coordinates the discussion of food materials and their preparation.

Part IV gives tabular material and special tests. Proximate composition of foods with contained vitamins is listed. "Classification of Foods According to Nutritive Values" should be a great convenience in planning special diets.

The text has been prepared with special consideration of the needs of student nurses but the subject matter is treated in such a way as to be suitable for college students and for interested lay readers. The book is well bound, illustrated and very readable.

CHEMISTRY OF MUSCULAR CONTRACTION. Second Edition. Revised and Enlarged. By *A. Szent-Györgyi*. The Institute for Muscle Research at the Marine Biological Laboratory, Woods Hole, Massachusetts. Fabrikoid. Price, \$4.50. Pp. 162 with 56 illustrations. Academic Press, Inc., 125 East 23rd Street, New York 10, 1951.

The "Chemistry of Muscular Contraction" by Szent-Györgyi is a brilliant dissertation. Into the pages of this book are packed the results of the author's researches on the complex problem of muscular contraction which he started in 1940. The results obtained from 1940 to 1943 were first published briefly as "Studies" from the University of Szeged, Hungary. In these pages the discovery of Actin, the "crystallization" of myosin, the discovery of actomyosin and its fascinating reactions with A. T. P. were described. It is now generally accepted that without these discoveries a comprehension of muscle would be impossible. Few scientists have had to write and work under more difficult circumstances and greater stress than this remarkable man.

In 1947-48 research, with the major part of the research team, was transferred from Sweden to the United States. The weaker points of earlier work were sifted out and new observations made. The glycerinated psoas fiber was introduced and allowed the study of contraction without relaxation, undisturbed by excitation. In association with Wycoff the mechanism of fiber formation was clarified, and the architecture of the contractile mass was outlined. These new observations are the basis of the second edition.

In the introduction, chapter one, the author attempts to define the meaning of the term "life" and organization. Four decades of research have left no doubt in the writer's mind that there is only one life and one living matter, however different its structures, colorful its functions, and varied its appearance. He states there is no real difference between the grass and him who mows it. Muscle has been chosen by the writer as material for the practical advantages it offers and leaves the question of the method of approach, the method to be used and the attitude of the investigator to be decided.

Szent-Györgyi states there are two approaches: morphology and physiology.

The method and instrument of analysis has many sides so that all methods of approach and instruments available need to be used in one coordinated attack. He pleads for the use of one instrument lately fallen into disrepute — namely, our eyes. The author states if he ever achieved any success in research it was due to petty observations.

The attitude used by the author in his research was to start with the whole, keep it together as long as possible learning everything possible. Then start pulling it to pieces, bit by bit, trying after every step to put it together again to correlate the new partial system with the whole.

Thus, states the author, we can hope that a thorough understanding of the living state will help to develop a more scientific biology and medicine, while a more intimate knowledge of muscle will lay the foundation for a more scientific cardiovascular medicine.

In his second chapter on the structure of muscle, the psoas muscle was chosen for study because its fibers are parallel from end to end of the muscle with a paucity of connective fibers. He states since the rabbit is easily obtainable, does not bite or bark, is neither too big nor too small, is rather cheap and very stupid, its *Musculus psoas* was chosen as the object of study.

Whole muscle is the subject of chapter three. Szent-Györgyi states that the physical properties of muscle are not simply properties of the constituting proteins. The properties of these proteins depend to a great extent on their interaction with A. T. P. which governs their properties and therefore can justly be called the "master substance of muscle."

The physical disintegration of muscle is the subject of chapter four. In chapter five the chemical disintegration of muscle is discussed. This is followed by chapters on myosin, actin, actomyosin, actin and myosin in muscle, thermodynamics, energetics and mechanics, the contraction cycle, smooth muscle and heart muscle, the continuum theory, and water and viruses. The book closes with a useful appendix on the technique of methods for extraction of the various tissue products. An excellent bibliography is given but no subject index which seems unfortunate to the reviewer.

The book is well illustrated and written in

clear concise language. The subject matter is most logically presented. The entire volume from cover to cover makes such a fascinating cohesive story that once the reader begins the study it is difficult to put it aside. Szent-Györgyi displays a delightful but simple sense of humor in searching for analogies. The following is an excellent example: "The peptide chain may be the backbone of the structure, but it tells us no more about the real function of the protein than the dug-up backbone of some prehistoric animal tells us about its married life."

This volume is highly recommended and is a must for every physiatrist whose problems deal so intimately with muscle. The physical therapist will also find it a valuable aid in understanding better muscular contraction.

HANDBOOK OF MEDICAL MANAGEMENT. By *Milton Chatton, A.B., M.D.*, Instructor in Medicine, University of California Medical School, San Francisco; *Sheldon Margen, A.B., M.D.*, Clinical Instructor in Medicine, University of California Medical School, San Francisco, and *Henry D. Brainard, A.B., M.D.*, Assistant Clinical Professor of Medicine and Pediatrics, University of California Medical School, San Francisco, Assistant Clinical Professor of Pediatrics, Stanford University School of Medicine, Physician in Charge, Isolation Division, San Francisco Hospital. Second Edition. Paper. Pp. 507. Price, \$3.00. University Medical Publishers, Postoffice Box 761, Palo Alto, California, 1951.

This handbook is made up of twenty chapters in which is given a brief description of various diseases followed by an outline of modern treatment. All of the diseases are coded according to the 1942 edition of Standard Nomenclature of Diseases and Operations. This second edition of the handbook is small in size, compact and handy for quick reference.

MANUAL OF MASSAGE AND MOVEMENTS. By *Edith M. Prosser, T.M.M.G.* Trained Nurse and Certified Midwife. Member of Council of Chartered Society of Massage and Medical Gymnastics, 1936-1944. Sister in Charge of Massage Department and Principal of School, 1930-1949, continuing Examiner for Chartered Society of Physiotherapy at the Middlesex Hospital, London since 1928. Illustrated by Miss M. Ruddick. Cloth. Price, \$5.00. Pp. 388, with 287 illustrations. J. B. Lippincott Company, 227-231 S. 6th St., Philadelphia 5, 1951.

This is an excellent British textbook written for the use of instructors in physical therapy as well as for the practicing therapist. The author has had a rich experience as a teacher and as an examiner for the Chartered Society of Physiotherapy. This experience is reflected in the presentation of the material.

Miss Prosser gives a brief but interesting history of the development of the Chartered Society

of Physiotherapy' from its inception in 1894 to the present time. This should be an inspiration to the newer members of the Society and a source of great satisfaction to those who have sacrificed so much to raise the standards of their profession.

In this third edition, Miss Prosser states she has tried to emphasize the importance of massage as there is a tendency to underrate this form of therapy. It is, therefore, essential that much thought and consideration should be devoted to its teaching in the schools. The author urges all students using this textbook to study the theory of the work assiduously so as to avoid the pitfalls of faulty and ineffectual technique.

There are twenty-two chapters. Massage is discussed in the first five chapters. The remainder of the text is devoted to exercise. Chapters six to eleven the fundamentals of exercise and chapters twelve to seventeen exercises for specific parts are outlined. Exercises for spinal deformities are given in chapters twenty to twenty-two. There is a chapter on rules for making up a gymnastic table and an appendix on muscle work of walking. There is also a set of examination questions used in the examinations of the Chartered Society of Physiotherapy which will interest the physiotherapists in this country.

This book is well planned, written in good style and instructions are given in logical sequence. The figures are all line drawings but quite adequate for their purpose. It is a book written by and for the physiotherapists. It is highly recommended.

THE NEUROSES: DIAGNOSIS AND MANAGEMENT OF FUNCTIONAL DISORDERS AND MINOR PSYCHOSES. By *Walter C. Alvarez, M.D., Professor of Medicine, Emeritus, Mayo Foundation, University of Minnesota; Emeritus Consultant in Medicine, the Mayo Clinic.* Cloth. Price, \$10.00. Pp. 667. W. B. Saunders Company, 218 West Washington Square, Philadelphia 5, 1951.

This book is, indeed, one which deals with the art of medicine. Only after many years of scientific medicine does the physician fully appreciate the application of his art. Dr. Alvarez points out the many pitfalls to which the young physician is subjected as he develops an understanding of the mental peculiarities and the worries, strains and life problems of his patients. Early in the practice of medicine the doctor realizes the difference between a history given by a patient and that in a textbook. From his rich experience the author presents information which clarifies this problem. Moreover, the book contains many details of symptoms associated with the neuroses and psychoses.

Dr. Alvarez repeatedly points out the failure of therapy in many given disorders and he attributes this to a lack of insight into the problems of the patient as a whole. The success of abdominal or pelvic surgery is not dependent upon the existing pathology alone, but even upon the emotional,

sexual, social, domestic and economical status of the patient. Elimination of one condition does not cure; it only encourages the patient to lose faith in the profession.

In addition there are excellent chapters on pain, and practical methods of psychiatric treatment. A good bibliography is included. This book is highly recommended to the physician starting out in private practice.

THE AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS INSTRUCTIONAL COURSE LECTURES, VOLUME VII, 1950. Editor, *Charles N. Pease, M.D., Associate Editor, Sam W. Banks, M.D.* Cloth. Price, \$6.50. Pp. 285 with illustrations. J. W. Edwards, 300 John Street, Ann Arbor, Mich., 1950.

This present volume represents the Instructional Course of the American Academy of Orthopedic Surgeons of February, 1950, and lives up to the standard of excellence of the previous volumes. Some of the subjects of particular interest are the discussions on tumors and metabolic bone diseases, genetics, embryology and congenital malformations, and the three papers on lower extremity amputations, including fitting with particular attention to suction socket artificial legs. There are also interesting and informative chapters on scoliosis, reflex sympathetic dystrophy, lesions simulating intervertebral disc protrusion, tendon disease and muscle physiology including the use of resistance exercises. This is a useful book for those training in the fields of orthopedics and physical medicine and rehabilitation.

OLD AGE: SOME PRACTICAL POINTS IN GERIATRICS AND GERONTOLOGY. By *Trevor H. Howell, M.R.C.P., Lecturer in Problems of Old Age, St. Bartholomew's Hospital, London.* Second edition. Boards. Price, \$1.47. Pp. 108, with 9 illustrations. H. K. Lewis & Co., Ltd., 136 Gower St., London W. C. 1, 1950.

This book combines the objective, quantitative facts of medical science with common sense and humane attitudes. After the opening chapters on general problems of care and comfort there are chapters dealing with the specific problems of pulse, temperature, and the various systems of the body. A special chapter on "Geriatric Rehabilitation" and the closing chapter on "The A. B. C. of Geriatrics" are of particular interest from the standpoint of physical medicine, rehabilitation, and occupational therapy.

Confusing is the chapter on the hemoglobin level in old age, where for some reason the data are first given in percentages and later translated into grams per milliliter. The question "percentage of what?" is fundamental here, and neither the author's allusion to standard error on page 26 nor that to normal standards on page 27 allay the fear that he has become involved in a vicious

circle. His concluding statement, on page 28, giving the average hemoglobin of 53 men as "108.058 per cent of 18.3 gms./100 ml." conveys an altogether misleading idea of the precision of these data, and "of" is presumably an error for "or." The data on temperature on page 12 are practically useless because the time of day when they were taken is not stated. The statement that these patients were "without any febrile disorder" raises the fear that a *petitio principii* may be at work here, too. A patient can be excluded from a temperature study because of other abnormal findings but not because the observer thinks his temperature is too high; the latter would be like excluding everyone over six feet high from a study of normal stature. This fallacy is worth mentioning because it is still encountered in other fields of medical investigation, an instance being a large collection of blood pressure data that were vitiated by the arbitrary exclusion of all figures above 140 before the averaging was done. In the present instance the discussion of blood pressure (page 33) fortunately does not become involved in this difficulty, but it is unfortunately very brief. It would be very helpful to know how many of the author's patients with blood pressures above 200 mm. were inconvenienced thereby, and what symptoms they manifested. These suggestions are made in the hope that the author will feel encouraged to continue work so well begun. The book contains ideas of value to the general practitioner as well as to the specialist in geriatrics.

THE SCIENCE OF HEALTH. By *Florence L. Meredith, B.Sc., M.D.* Second edition. Cloth. Price, \$1.75. Pp. 452, with 134 illustrations. The Blakiston Company (Division of Doubleday & Company, Inc.), 1012 Walnut St., Philadelphia 5, 1951.

This splendid text has been written to aid teachers to present hygiene briefly yet in a manner befitting a scientific subject in a college curriculum. This volume fills a very definite need for a comprehensive text especially when only isolated lectures or discussions are used as a medium of teaching.

The author has attempted and certainly succeeded in giving facts usable by the student in making his own decisions in whatever circumstances he finds himself; in giving opinions generally held by medical science; in weighing the material properly, giving each subject an amount of space proportional to its importance; arranging the material so that its order and sequence in itself is educational in effect; and in using scientific terminology insofar as it helps to clarify the student's thinking.

The text is divided into five sections as follows: introduction; daily maintenance of health; major health problems in the United States; mental

health; and the next generation.

The book is well written with excellent illustrations to amplify the text. For those teachers who have a limited time allotted for presentation of their course in hygiene, this text should be most welcome. It is no small task to write an adequate text for a short course but the author has selected and weighed the material with rare skill.

JAMES LIND: FOUNDER OF NAUTICAL MEDICINE. By *Louis B. Roddis, M.D.*, Captain of Medical Corps, United States Navy. Cloth. Price, \$3.00. Pp. 177. Henry Schuman, Publisher, 20 East 70th Street, New York 21, 1950.

A fascinating account of life at sea in the middle eighteenth century. The tremendous loss of life and endless suffering of the seamen seems almost unbelievable today. The contributions of Lind as indicated in this well documented monograph convincingly prove what an exalted position he should hold among the benefactors of mankind and in medical history. Good reading to shorten a train ride or to bring a few hours of profitable relaxation at home.

The book is small and attractively bound and printed. One mistake is noted on page 38 where typhoid is used instead of typhus.

PHYSICAL EDUCATION ORGANIZATION AND ADMINISTRATION. By *Jay B. Nash, Ph.D.*, Professor of Education, Chairman of the Department of Physical Education, Health and Recreation, School of Education, New York University; *Francis J. Moench, Ph.D.*, Director of Education, Division of Health, Physical Education and Recreation, College of Education, State University of New York, Cortland, and *Jeannette B. Saurborn, Ed. D.*, Director of Physical Education, Elementary School, Bronxville, New York. Fabrikoid. Price, \$5.00. Pp. 498, with 62 illustrations. A. S. Barnes & Company, 101 5th Ave., New York 3, 1951.

This book deals with the organization of physical education in the public schools and the first part of the text deals with the broad aspect of education, with particular reference to the contributions of physical education. Both education and physical education are treated as a process and the outcomes are discussed in terms of a product. For those interested in the problems of physical education in the public schools this text should prove invaluable, especially as it is written by such well known authorities in this field. The book is well written and well illustrated with excellent charts and diagrams. While of interest to physical educators, this splendid volume will have little appeal to the physiatrist or physical therapist.

PHYSICAL MEDICINE ABSTRACTS

Practice of Physical Therapy. Edit.

New Eng. J. Med. 244:452 (March 22) 1951.

A degree of confusion has been occasioned in the Commonwealth by the existence of two organizations concerned with physical therapy. The Society of Graduate Physical Therapists, which might politely be said to represent the goats, is allegedly made up of the graduates of substandard and commercial schools of physical therapy. The Massachusetts Chapter of the American Physical Therapy Association, on the other hand, which may with equal propriety be considered to represent the sheep, is composed of the graduates of those schools approved by the Council on Medical Education and Hospitals of the American Medical Association.

Last year a bill was sponsored in the legislature that provided for the regulation of the practice of physical therapy in the State. Not only was this a mandatory bill, which prohibited visiting nurses, licensed attendants and workers in physician's offices from carrying out any form of physical therapy whatever, but also it failed to provide at all for medical direction. The bill was defeated, although its passage had been favored by the legislative committee on public health.

A bill had been filed in 1951 by Mr. Charles J. Dunn, counsel for the Committee on Legislation of the Massachusetts Medical Society, at the insistence of the Massachusetts Chapter of the American Physical Therapy Association. This bill defines a physical therapist as "a person who practices physical therapy as defined in this act under the prescription, supervision and direction of a person licensed in this state to practice medicine and surgery." The use of roentgen rays and radium for therapeutic purposes is excluded in the definition of physical therapy.

The passage of this bill should be encouraged.

Recent Advances in Treatment of Migraine. Arnold P. Friedman, and Theodore J. C. von Storch.

J. A. M. A. 145:1325 (April 28) 1951.

Treatment of migraine has posed a problem for many years. Its severity and the tenacity of the symptoms have caused much concern to physician and patient alike. The number and multiplicity of therapeutic agents and the uniformly good results reported with these medicaments indicate the unsatisfactory state of knowledge concerning treatment.

In the treatment of migraine, the physician has four main methods which can be used, either alone or in combination: psychotherapy, pharmacotherapy, physical therapy and surgery. He may

merely offer symptomatic relief or strive to prevent the recurrence of the headaches. The latter obviously is the ideal, but most therapy to date falls short of this goal.

Physical therapy (heat, massage and traction) was used in only 15 of the 604 patients treated in this series. The results were unsatisfactory.

The Role of the Rh Factor in the Etiology of Cerebral Palsy. Irwin Philip Sobel, and Hazel S. Wilhelm.

J. Pediat. 38:447 (April) 1951.

It has been known for almost a decade that maternal isoimmunization to the Rh factor may cause cerebral damage — the syndrome of kernicterus. The clinical manifestations may be choreoathetosis, spasticity, mental defect, plastic opisthotonos, paralysis, ataxia — in short, the classical picture of cerebral palsy. The authors attempted to determine how great a role maternal isoimmunization to Rh plays in the causation of cerebral palsy.

The study was based upon 98 children with cerebral palsy from the Cerebral Palsy Pre-school Center of the Lenox Hill Hospital. In only three was the cerebral damage caused by kernicterus. It was concluded that maternal isoimmunization to the Rh factor plays only a slight role in the etiology of cerebral palsy.

The Preventive Aspects of Chronic Disease. Edward M. Cohart.

J. Connecticut M. Soc. 15:325 (April) 1951.

A program for the prevention or diminution of disability and the prevention or postponement of death from the chronic diseases is based upon early diagnosis and adequate treatment.

The prevention of total or partial disability or the curtailment of its duration often will require, in addition to medical and surgical care, physical or psychological rehabilitation, convalescent care, home nursing, or housekeeping service. Occupational rehabilitation and job placement often can restore varying degrees of productive capacity to a partially disabled individual who would otherwise remain totally unproductive. Facilities for these extensions to therapy are commonly either totally lacking or inadequate. Individual action on the part of either the patient or physician, or both, ordinarily will not succeed in supplying them. Their provision, therefore, becomes a matter of social responsibility.

A community program for the "prevention" of chronic disease should include the following activities: (1) definition of the problem; (2) public health education; (3) professional education; (4)

provision of adequate diagnostic treatment, rehabilitation and ancillary facilities; and (5) social service.

Sister Kenny. Edit.

New York State J. Med. 51:1138 (May 1) 1951.

The great infantile paralysis epidemic of 1916 left a host of crippled humanity in its wake, the extent of which is difficult to conceive by anyone who had not the opportunity to observe it.

In the following years a great development along these lines took place in this country, largely under the aegis of orthopedic surgeons. The employment of rest, splintage, bracing, heat, massage, underwater exercises, muscle reeducation and graduated use, all correlated as a unit and not as isolated independent facet-like enterprises, resulted in a reasonably satisfactory regime of which the profession could be justly proud. More and more organizations were established to implement these measures.

Poliomyelitis. S. P. Meadows.

Brit. J. Phys. Med. 14:4 (April) 1951.

It is now considered that convalescent serum is ineffective at any stage of poliomyelitis, and controlled observations on epidemics support this view.

Any patient suspected of poliomyelitis should be confined strictly to bed, as there is evidence that exercise in the preparalytic stage may influence the localization and increase the severity of the subsequent paralysis.

Reeducational exercises, after the acute stage, and, in suitable cases, swimming in warmed baths, should be continued. Electrical treatment in any form probably is of little value, except from a psychological aspect.

Objective Evaluation of Personality Tests. Joseph Zubin.

Am. J. Psychiat. 107:569 (Feb.) 1951.

Progress in scientific use of tests has always lagged behind advances in clinical practice. This held true of intelligence tests in the last generation and now holds true even more of personality tests.

The popularity of personality tests in the clinical field is one of the outstanding characteristics of the American scene. Personality tests of the projective variety — Rorschach, TAT, and so forth — are now standard laboratory tests in most clinics, are administered routinely in pre- and post-treatment procedures in psychotherapy as well as somatotherapy.

The final judgment that the scientist must perforce arrive at is that no objective evaluation can now be made of personality tests because they have not yet attained the status of tests yielding specifically defined scores. As techniques for aiding in clinical judgment, they have proved their

worth. As independent tests they are found wanting.

The reason for their failing is that no two responses are ever sufficiently identical to be classified as equivalent. In order to evaluate responses some abstract dimensions must be provided. But insufficient theoretical frameworks have thus far been provided for abstracting the concrete response. The present scoring systems are too concrete, too close to the original response and not sufficiently abstracted to yield a measurable dimension of behavior. When the personality tests yield abstract scorable dimensions of the variety that the physicist finds when he abstracts from a given concrete object its weight, temperature, volume, etc., we shall be able to make more headway.

For this reason, scientists are providing rating scales for catching the essence of the concrete responses and for classifying these essences along proper dimensions. The virtue of these scales is that they reveal not only what types of responsiveness the patient exhibited, but also which type he failed to exhibit. Another solution that scientists are seeking is to reduce the personality techniques to simpler structure, and to utilize more specific direction for obtaining measurable performance.

Whether such approaches will eventually elevate projective techniques to the status of personality tests is still debatable. Some evidence, however, has been provided to show that scaling of variables and simplifications of test material lead to more precisely definable relationships with clinically observable variables. Whether these tests, even in their higher level of development, can replace clinical judgment, interviews, or examination is highly doubtful; but that they can be of greater helpfulness and of greater dependability is much to be hoped.

Treatment of Neurosyphilis with Penicillin Combined with Artificial Fever Therapy. II — Further Observations. Norman N. Epstein, and James R. Allen.

Arch. Dermat. & Syph. 63:419 (April) 1951.

Penicillin therapy combined with artificial fever produces satisfactory results in most types of neurosyphilis. These results cannot be accurately compared with the effects of penicillin alone in the treatment of neurosyphilis. It is the impression of the authors that the clinical response is better when penicillin and fever are used in combination than when penicillin alone is employed, particularly in treatment of patients with dementia paralytica, optic atrophy and meningovascular neurosyphilis. In cases which prove resistant to penicillin alone, the combined therapy, fever plus penicillin, should be used. Mechanically induced artificial fever is safer, more easily controlled and preferable to artificially induced malaria. Their own procedure, known as the "blanket method," has been found the simplest way of elevating body temperature.

The fever therapy should be administered simultaneously with the penicillin as it enhances the spirocheticidal properties of the antibiotic agent.

Eighty-one patients with various forms of neurosyphilis were treated with penicillin combined with artificial fever induced by the "blanket method."

It was concluded that while penicillin therapy alone is of great value in the treatment of neurosyphilis, a combination of penicillin with fever therapy is indicated for patients with dementia paralytica, its tabetic form, and primary optic atrophy and for those who do not respond satisfactorily to penicillin alone.

Non-Articular Rheumatism. Richard Harold Freyberg.

Bull. N. Y. Acad. Med. 27:245 (April) 1951.

The commonest form of non-articular rheumatism affects the fibrous connective tissue and consequently has been called "fibrositis." Its treatment is supportive and symptomatic. Usually it is helpful for the patient to avoid strenuous physical activity and to procure additional rest during the daytime, but it is a mistake to curtail ordinary activity and recreation that is not fatigue-producing. Mild exercise, especially after application of heat, usually relieves the stiffness and aching; however, prolonged physical activity commonly increases the discomfort. Heat relieves; massage gradually made rather "firm" usually is helpful. Hot packs are helpful for severe localized pain and warm baths are the best means of heating the whole body. Inflammation of a bursa is a common form of localized fibrositis. Since bursae exist about all large joints and some small ones, bursitis may occur in many locations. Treatment should be directed to relieve pain and to maintain function; reassurance should be given that the disorder is localized and comparatively mild. Radiant heat or diathermy may relieve, but sometimes aggravate the pain, then cold applications usually relieve. Rest of the shoulder is advisable during the acute phase; graded exercises to restore motion should be instituted as soon as pain lessens. Procaine block of the superior cervical ganglion or brachial plexus will give temporary relief and allow exercise of the shoulder to avoid stiffness. The shoulder-hand syndrome is an interesting and incompletely understood form of non-articular rheumatism which may follow myocardial infarction or other painful intrathoracic lesions, cerebral vascular accidents, irritative lesions in the neck or upper extremity, and sometimes exists without recognizable cause. It is characterized by pain in the shoulder or hand, commonly in both parts; it may be unilateral or bilateral. Shoulder motion becomes limited and the affected hand becomes edematous and painful so that it is held stiff. After several weeks, atrophy occurs in the shoulder and hand and adhesions or contractures limit motion in the affected parts. Treatment with the usual physical measures and analgesics commonly fails. Procaine block of the

brachial plexus or superior cervical ganglion usually is an effective means of temporarily allaying pain, which should be accomplished early in the illness, so that functional exercises can be performed to prevent stiffness. If stiffness of shoulder and/or hand results, rehabilitation depends upon persistent physical and occupational therapy.

A Study of the Adjustment of 500 Persons Over Sixteen Years of Age With Disabilities Resulting from Poliomyelitis. George G. Deaver.

N. Y. Med. 7:16 (Apr. 5) 1951.

There has been much speculation about the proportion of persons with residual disabilities from poliomyelitis, who having received extensive care and treatment through childhood, nevertheless by the time they approach adult life, have not achieved their maximum capacity to perform the physical activities inherent in daily living and working. In order to obtain authentic information on this subject, this study was undertaken and the following conclusions were reached. When patients with poliomyelitis are left with a residual disability, it is to be expected that some will have no handicap in performing the physical activities of daily living; others will be handicapped but able to meet these demands adequately; and others will have inadequate compensations. Inadequate follow-up of patients results in three times as many persons with inadequate compensation. If the disabled are taught to perform the activities of daily living, it is probable that only three per cent could not be trained and employed in positions suited to their abilities and disabilities; the large majority have the mental and physical capacity to lead a normal life and achieve a satisfactory social and emotional adjustment; psychological factors are no less important than physical factors in the adjustment of the disabled and should receive scientific study and treatment to the same extent as physical factors; social service, with many exceptions in individual cases, was on the whole extremely inadequate for the group studied; the educational attainment of these disabled persons seemed to be equal to that of the general population of the city; the rate of employment for the group studied was 15 per cent lower than for the general population of New York City; deprivation in social activities seems to be an even more important factor in maladjustment than lack of vocational opportunities; there is little difference between the sexes in regard to extent of disability, education and general adjustment, but women are worse off than men in regard to employability, economic status, social life, and attitude toward the disability.

Among the subjects that should receive further investigation, as indicated by the data of this study are: a) The use that is made of existing opportunities for vocational guidance and training; b) the role of social service in rehabilitation; c) the importance of emotional factors in adjustment, with particular reference to rehabilitation, education, and employment; and d) the effect of par-

ental over-protection on social and emotional adjustment.

Rehabilitation from Pediatrics to Geriatrics: Disgraceful Lack of Rehabilitation Facilities Alleged. Albert A. Martucci.

Pennsylvania M. J. 54:237 (Mar.) 1951.

The purpose of a survey made by the Commission on Physical Medicine and Rehabilitation of the Medical Society of the State of Pennsylvania was to discover what services and facilities are at present available for the rehabilitation of the people of the Commonwealth of Pennsylvania. The results shown by the hospitals that responded to the questionnaires demonstrated a woeful lack of rehabilitation facilities either on an out-patient or as an in-patient service. It has been estimated from the survey that less than one-half of one per cent of the hospital beds in the Commonwealth of Pennsylvania are devoted to any type of rehabilitation, and a conservative estimate is made that there are 10,000 persons in the state needing such services. If we are to meet the problem of rehabilitation from pediatrics to geriatrics, it is necessary that 10 per cent of the present hospital beds be made immediately available for rehabilitation. It has been proved by the Army and Navy hospitals and the Veterans' Hospitals that miraculous results could be obtained by a rehabilitation program. Getting these patients back into society and enabling them to assume the best economic position possible in their community is a "must" in view of present-day emergencies. It has been proved that patients so rehabilitated become self-sustaining, independent, and contribute to the welfare of society as a whole rather than become burdens.

Geriatrics and Rehabilitation. Howard A. Rusk.

Geriatrics 6:143 (May-June) 1951.

Today, there are more than 28,000,000 Americans who suffer from chronic disease and physical disability. Staggering as this is, we can expect it to increase in the future; for as our population becomes older, the incidence of chronic disease and its resultant physical disability will increase correspondingly. The problems of geriatrics and chronic disease are particularly clear-cut, for example, in the Veterans Administration. In meeting the problem, there are obviously four phases to be considered: (1) Research into the causes of degenerative disease and the aging process; (2) the program of prevention; (3) improving methods of definitive and medical and surgical care, and (4) rehabilitation and utilization of the chronically ill and disabled individual. Hospitalization for mental diseases is increasing at a faster rate among aged persons than the increase in the rates for all ages. That there is a preventive medicine, however, for this group is shown by the experience of various specialized agencies for the aged which are being developed in many communities. Illustrative of such groups is the Wil-

liam Hodson Community Center in New York City. Originally open only a few hours a day, the center is now open daily. The members administer its activities through self-government; and during the week they paint, work at arts and crafts, visit (which is a major activity), edit their mimeographed magazine and plan their monthly birthday parties and entertainments. In improving our present definitive therapeutic approach, experiences with the newer concepts of early ambulation and conservative surgical procedures promise much if the older-age group requires surgery.

That results can be obtained with a dynamic approach is shown by a study completed in 1947 at the Veterans Administration Hospital in Minneapolis by Baker and his associates with a group of 130 chronic neurological patients, all but two of whom were veterans of World War I and many of whom had been hospitalized continuously for more than ten years, some confined to their beds for over two years. After nine months of intensive physical rehabilitation, 25 had left the hospital and were employed, 40 others had been discharged to their homes capable of light work, and of those remaining, 30 were ambulatory and undergoing advanced rehabilitation and 25 were capable of some self-care. All but 10 of the group had shown some worthwhile permanent improvement.

Experimental and Clinical Investigations of Peripheral Nerve Injuries of the Upper Extremities. George Perret.

J. A. M. A. 146:556 (June 9) 1951.

Early recognition of a peripheral nerve injury is the greatest single prophylactic measure that can be taken to insure a good result after surgical repair of an interruption in the continuity of a nerve trunk. Lesions of the median, ulnar, and radial nerves are the commonest of the injuries to the peripheral nerves in the upper extremities, and to these injuries must be added injuries of the brachial plexus. In general, it must only be kept in mind that an injury to a peripheral nerve produces the characteristic sign of a lower motor neuron lesion: that is, a flaccid paralysis, a loss of deep tendon reflexes and of sensation in all modalities, atrophy of muscles, and a reaction of degeneration on electrical stimulation. The contribution of Pollock and his associates — the question of electrodiagnosis in peripheral nerve injuries applied to the study of recovery before and after surgical repair — cannot be overemphasized, as the electrical signs of recovery antedate the recovery of motion and sensation by many weeks. The most important principle that affects the results of peripheral nerve surgery and is not sufficiently emphasized is that principle that stresses every effort to keep the effector mechanism in a state in which it may function. It is of little avail to have a perfect microscopic regeneration of a peripheral nerve trunk if the muscles are so atrophied and fibrosed and the joints so fibrosed

and ankylosed that they will not move. Such a peripheral nerve suture may be classified as a failure and yet regeneration within the nerve trunk may be perfect. Consequently, the intensive use of physical therapy and all of its adjuncts, electrical stimulation, massage, active and passive movements, and use of proper splinting of the paralyzed extremity or portion of extremity into a position of relaxation of the paralyzed muscle and of function of the limb is of great importance and cannot be overemphasized. Yet it is one of the factors in peripheral nerve surgery that is most often neglected.

Treatment of the Pyogenic Dermatoses. Ray O. Noojin.

J. M. A. Alabama 20:277 (Feb.) 1951.

Certain general measures may prove necessary in chronic recalcitrant cases. The possibility of an underlying diabetes mellitus or a chronic infectious focus should not be overlooked. If the patient has not responded well, bed rest should be required. At times this may mean the difference between treatment failure or success. Ultraviolet light applied generally as well as locally may be effectively added in an individual having recurrent bouts of folliculitis, impetigo, or furunculosis. In the treatment of erysipelas, insist upon bed rest, force fluids, immobilize the affected part, and apply wet compresses. The use of antitoxin and ultraviolet light usually are not necessary. Ultraviolet light locally in suberythral doses daily often is helpful in the treatment of sycosis vulgaris. In treating furunculosis, advise bed rest and immobilize the affected part. If it is painful, apply local heat in the form of infrared light or diathermy. Do not traumatize or squeeze.

Rheumatoid Arthritis: The Natural History of the Disease and Its Management. Charles Ragan.

Bull. New York Acad. Med. 27:63 (Feb.) 1951.

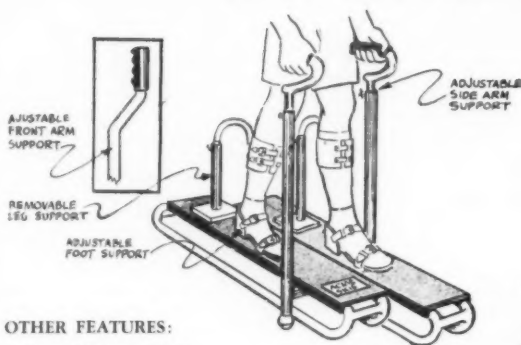
This is an evaluation of the accepted forms of therapy of rheumatoid arthritis in the light of the natural history of the disease in order to determine which therapy has modified the disease beneficially. Measures of so-called "proved" value directed towards improving the patient's general health include: Rest for the body as a whole and for the inflamed joints, both to be regulated carefully and combined with exercise as tolerated; a nutritious, well-balanced and appetizing diet and general hygienic measures; salicylates as anti-rheumatic and analgesic drugs and codeine for brief periods of time, if necessary; prevention and correction of deformities; physical and occupational therapy; psychotherapy, and rehabilitation. These measures were all employed in several studies of rheumatoid arthritis. Some patients received all measures, many received a few, and some received none. However, as a group, these measures failed to modify the end-result of the disease. No one would advocate the abandonment of these procedures since in most instances

they can do no harm; furthermore, they may bring solace and temporary comfort to the patient, if not objective improvement. If harm does ensue from their use, they should be discontinued. As an example of such harm, prolonged bed rest, even combined with careful supervision and regulated exercises, may be harmful to an individual with financial and family responsibilities which must be laid aside during such a stay in bed. Also, correction of deformities by operative orthopedic means leading to a joint in good position but firmly ankylosed may be of questionably beneficial value to the patient. Rehabilitation of the patient with rheumatoid arthritis is still in its infancy and no adequate survey has been made of its feasibility. Caution must be exercised in the use of rehabilitation. The great advances in rehabilitation in the past ten to fifteen years have been made on clinical material notable for the static nature of the disability. Thus in patients with paraplegia after poliomyelitis and with cerebral palsy, the injury has been sustained and rehabilitation takes over in an organism in which the cause of the disability itself is past. In such individuals, a steady progression of reeducation is possible. In rheumatoid arthritis, one is dealing with a dynamic pattern in which new disabilities continue to occur while reeducation of the static disabilities is being attempted. This makes for difficult rehabilitation and, at present, no certain answer can be given to the question, "is it possible by vigorous rehabilitative measures to reeducate a person crippled with rheumatoid arthritis to a sufficient degree to warrant the expenditure of time by the patient and the agencies involved?"

Doctor Bunim has described the effects of cortisone and ACTH on rheumatoid arthritis and the effect of these hormones certainly leaves no doubt in the mind of anyone as to their efficacy in controlling the symptoms of this disease. Previous to the use of induced hyperadrenalism, physical therapy — chiefly active and passive exercises — in the patient with rheumatoid arthritis was restricted to the limits of pain and fatigue. If these limits were exceeded, the results were usually disastrous in that the patient was so disabled the following day, no further exercises could be undertaken. The uselessness of any such plan of muscle building should be familiar to any one who has gone through a program of athletic training. To achieve an increase in muscle strength, muscles must be overworked and when limits to this amount of work are set, very little new muscle power is achieved. It has been noted that when a patient is on cortisone and ACTH, exercises can be carried beyond the limits of pain and fatigue without complete disability the following day. In this fashion, the patient with rheumatoid arthritis, while under the influence of cortisone and ACTH, may be treated as a normal individual and exercises can be carried forward as in the usual conditioning program. This is of great value in the rehabilitation of the patient and may portend a new era in rehabilitation as applied to rheumatoid arthritis.

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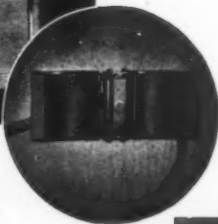
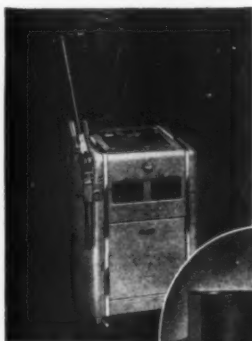
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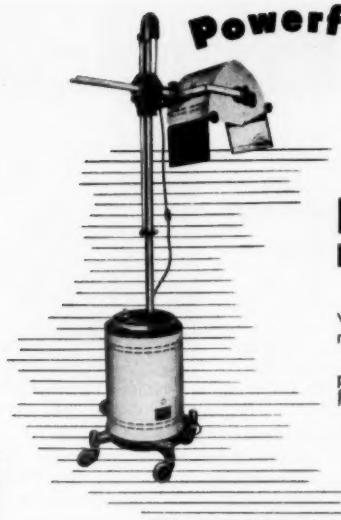


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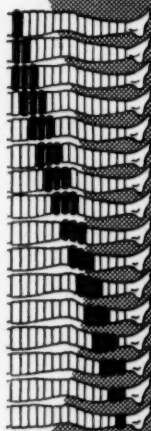
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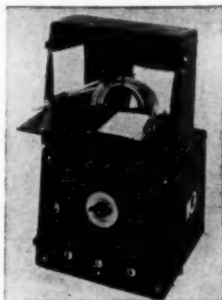
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Hospitals, 42 Assistant Residencies and Residencies, 55

Name of Hospital	Location	Chief of Service	Inpatients Treated	Number of Treatments	Asst. Res. & Residencies Offered	Beginning of Service (1950)	Beginning of Service (Month)
United States Army							
Letterman General Hospital*	San Francisco	A. E. White	21,861	128,112	2	1/1, 7/1	n
†Fitzsimons General Hospital*	Denver	H. B. Lucombe	21,090	281,586	4	7/1	n
Army Medical Center*	Washington, D. C.	E. M. Smith	8,676	134,137	6	7/1	n
Veterans Administration							
†Veterans Admin. Hospital ¹	Ft. Logan, Colo.	F. J. Fricke	4,610	58,879	1	7/1	n
Veterans Admin. Hospital	Chamblee, Ga.	G. D. Williams	4,923	39,181	1	7/1	n
Veterans Admin. Hospital	Hines, Ill.	L. B. Newman	20,052	475,950	2	1/1, 7/1	n
Veterans Admin. Hospital	New Orleans	S. Winokur	1,107	49,815	1	7/1	n
Veterans Admin. Hospital ¹	Frammingham, Mass.	F. Friedland	9,000	24,000	2	7/1	n
Veterans Admin. Hospital ¹	Jefferson Bks., Mo.	S. Mead	4,046	53,920	2	7/1	n
†Veterans Admin. Hospital ¹	New York City	K. Harpuder	12,612	279,817	3	1/1, 7/1	n
Veterans Admin. Hospital ¹	Cleveland	H. T. Zankel	2,452	105,000	2	7/1	n
†Veterans Admin. Hospital	Aspinwall, Pa.	S. Machover	1,993	62,792	1	7/1	n
†Veterans Admin. Hospital	Portland, Ore.	E. W. Fowles	4,395	96,766	1	1/1, 7/1	n
Non-Federal							
Los Angeles County Hospital*	Los Angeles	O. L. Huddleston	33,606	132,694	1	Varies	\$165.00
White Memorial Hospital*	Los Angeles	F. B. Moor	8,333	7/1	120.00	50.00	
Stanford University Hospital*	San Francisco	W. H. Northway	2,322	25,088	1	7/1	75.00
University of Colorado Medical Center	Denver	H. L. Dinken	9,848	20,266	1	7/1	50.00
†Emory University Hospital*	Emory Univ., Ga.	R. L. Bennett	819	1,108	2	7/1	25.00
†Georgia Warm Springs Foundation	Warm Springs, Ga.	D. Kobak	3,357	32,282	1	1/1, 7/1	Varies
Cook County Hospital*	Chicago	C. O. Molander	1,607	19,443	1	7/1	100.00
Michael Reese Hospital*	Chicago	D. L. Rose	13,284	34,813	1	7/1	105.00
Northwestern University Medical School	Chicago	15,391	21,855	4	Varies	92.50	25.00
University of Kansas Medical Center*	Kansas City, Kan.	F. H. Krusen	920	10,951	7/1		
†Massachusetts General Hospital*	Boston	76,070	33,036	1	7/1	40.00	
Mayo Foundation	Rochester, Minn.	955	26,418	2	1/1	41.66	
Barnes Hospital*	St. Louis	1,202	126,904	1	7/1	50.00	
†Bellevue Hospital, Div. III—	New York City	322	291,115	1	7/1	135.00	
New York University*	New York City	17,885	15,575	1	Varies	100.00	
Goldwater Memorial Hospital*	New York City	3,073	21,769	1	7/1	200.00	
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New York City Hospital*	New York City	3,783	45,840	1	7/1	135.00	
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Reprinted in part J. A. M. A. 142:1195 (April 15) 1950.

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San Jose State College, San Jose, Calif.*	S. M. Durston, M.D.	Degree	2 1/2 yrs.	FebSept	4	\$650	Certificate
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Boston School of Occupational Therapy, 7 Harcourt St., Boston*	W. D. Paul, M.D.	High sch.	46 mos.	FebSept	5	\$144*	Cert. & Deg.
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University of Minnesota, Minneapolis*	Barbara Jewett	Degree	19 mos.	Varies	1	\$150	Degree
College of St. Catherine, 204 Randolph, St. Paul	A. Wenger, M.D.	High sch.	46 mos.	FebSept	2	\$75	Diploma
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** Detailed in A. M. A. 148:519 (May 19), 1951.

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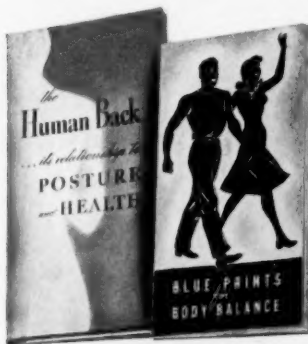
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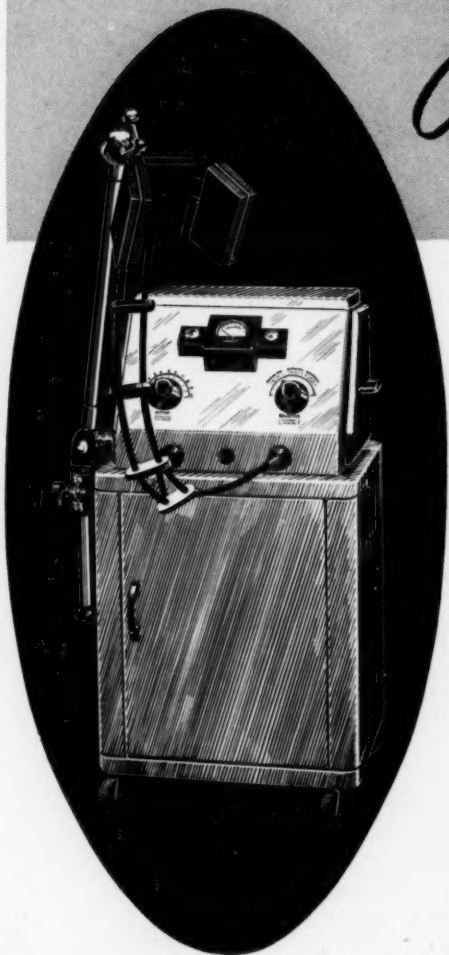
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